

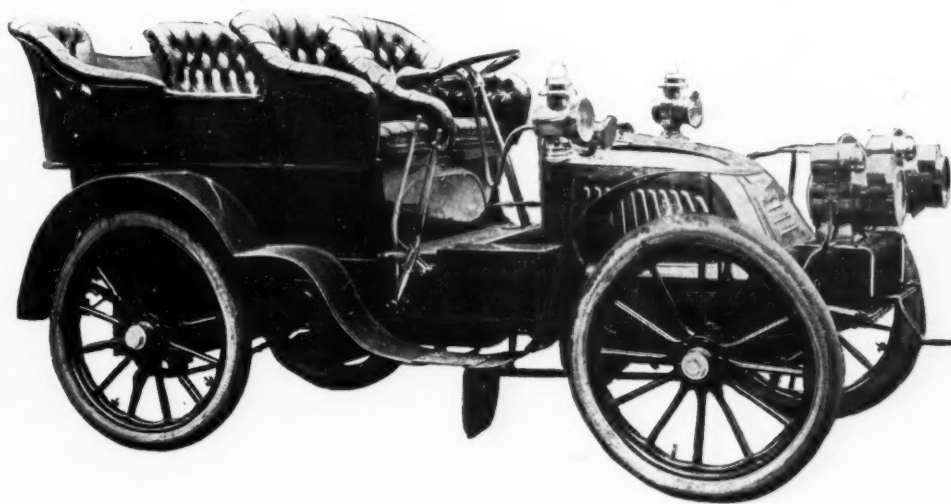
MOTOR AGE

Vol. 3 No. 6

FEBRUARY 5, 1903

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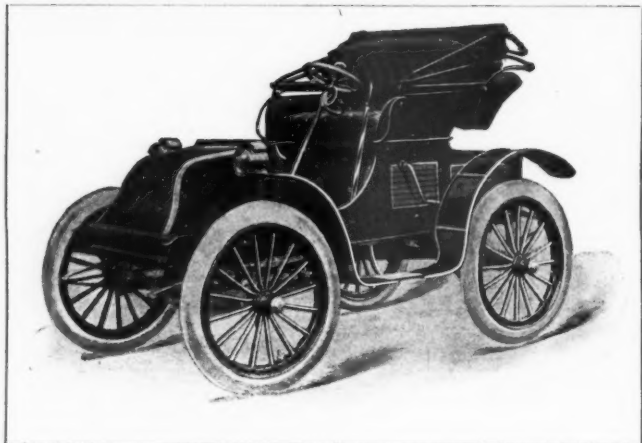
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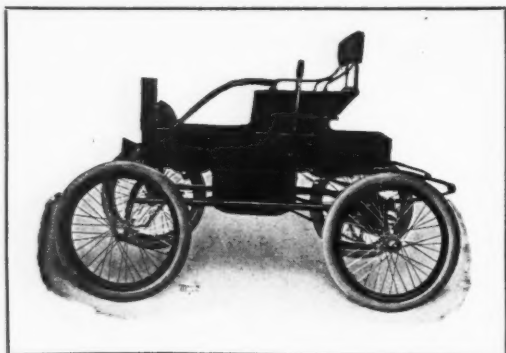
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The Baker Motor Vehicle Co., Cleveland, O.

MOTOR AGE

VOL. III. NO. 6.

FEBRUARY 5, 1903.

\$2.00 Per Year.

THE CLEVELAND AUTOMOBILE EXHIBITION

Cleveland, O., Feb. 2—The defect common to nine-tenths of the affairs of the kind—delay in getting started—held good with a vengeance in the case of Cleveland's first automobile show, which opened for spectators this evening. Seven of the twenty exhibitors of automobiles have not completed their exhibits at this writing.

SHIPMENTS DELAYED

The delay was not caused through mismanagement or lack

were all the contemplated exhibitors present, it can hardly be put down as representative even of the strength of the trade in this section in view of the absence of such factors in the trade as the White, Peerless, Baker, American, Cleveland, Berg, and Packard companies. There were various reasons for the failure of these concerns to exhibit; some of them claiming to have sold out their possible output, while others did not care to differ from what seemed to be the consensus of opinion of the manufacturers' association relative to local shows.

But if the attendance the first evening is

son Square Garden, though it was only those that came by express that arrived in time for the opening. The most interesting innovations were the Geneva steam touring car, the Union friction transmission, Wick "Blue Goose" and the Rogers & Thacher touring car, which were exhibited for the first time at any show.

THE VEHICLE DISPLAYS

Never before displayed and of unusual construction, the 10-horsepower Geneva steam tonneau exhibited by the Geneva Automobile Mfg. Co. is creating much interest. The most radical departure from ordinary practice is the use of a horizontal, double cylinder motor directly connected by spur gearing to the rear axle, through the differential. The semi-flash boiler of spiral tube construction and with a kerosene burner is placed under a bonnet on



Geneva Steam Touring Car



Rogers & Thacher Touring Car

of attention on the part of the promoters, but through the inability to secure good service from the railroads. The automobile trains containing the exhibits from New York and bound for Chicago arrived in Cleveland Saturday morning and eight cars of machines designed for Cleveland were sidetracked. Incidentally the cars must have become uncoupled and each allowed to take care of itself. At any rate the eight cars became a part of the mixed freight which has blocked Cleveland's yards for weeks, hence when anxious dealers and manufacturers sought their shipments they were given very uncourteous treatment. It was a case of each one hunting his own car.

HARDLY REPRESENTATIVE

While the show would be thoroughly comprehensive as indicating the advance in the art

any criterion the Cleveland public will amply live up to its reputation of being composed of the most enthusiastic automobilists in the country. The big armory simply would not hold any more people.

THE SHOW PICTURE

The decorations are of a pleasing order. From the center of the roof is festooned red, white and blue bunting. Nearly all the stands are decorated in bright colors and there are a number of electric signs. As to novelties, they were few and far between—after one had seen the New York show. In fact the majority of the exhibits came directly from Madi-

son Square Garden. An advantage claimed for the disposition of the engine is that all the gears, etc., being enclosed in the crank case are well lubricated by the splash system. The cylinder heads are suspended elastically relative to the body of the car.

The Geneva is equipped with a condenser in the form of copper tubes of flat oval section, which are disposed transversely in vertical sets just back of the

wire screen which forms the front of the boiler hood or bonnet. The tubes of the kerosene burner may be cleaned by sending hot steam through them after the fire has been turned out. The engine reverse is accomplished by a sliding gear and pinion device on the crank shaft which obviates the link motion and its consequent complication of small parts. An oil pump driven by the rod which actuates the water feed pump supplies the entire lubrication of the engine cylinders.

The fuel and water tanks are under the front seats and are of 15 and 20 gallons capacity, respectively. On the wheel steering column are placed the throttle lever and fuel and water regulating handles. The fuel by-pass valve is controlled by a small hand wheel on the dash. The running gear frame is similar to the standard rectangular frame of gasoline touring cars. It is of angle steel and supported by semi-elliptical springs. The finish of the car is excellent.

UNION AUTOMOBILE CO.

Friction drive is exemplified at the show by the single seat car made by the Union Automobile Co. A double opposed cylinder motor is placed transversely in the rear of the body with the sliding friction pulley engaging the forward face of the fly wheel. The final drive is by chain to a counter shaft and again by chain to the rear axle.

WINTON MOTOR CARRIAGE CO.

It goes without saying that C. B. Shanks secured a prominent position. The Winton exhibit occupies four spaces at the right of the main entrance. The display is even more elaborate than it was

at the New York show. A Winton chassis stands over an illuminated plate glass mirror, a scheme borrowed from Madison Square Garden. A touring car occupies the center of the space, while on the right is the famous Bullet, which is constantly a center of attraction.

HARRY S. MOORE

Harry S. Moore, agent for the Elmore Mfg. Co., has that company's exhibit as displayed at the New York show. It consists of the 10-horsepower tonneau and the 6-horsepower runabout. A two-cycle motor is displayed in a frame and attracts great attention among those mechanically inclined.

CLEVELAND AUTOMOBILE SUPPLY CO.

From point of size the most prominent exhibit is that of the Cleveland Automobile & Supply Co., agents for half a dozen leading

makes. There are four spaces in the automobile section in the center and four at the side, the latter devoted to sundries. In all there are about fifteen vehicles, including the Locomobile, Searchmont, Columbia, Studebaker, Cadillac and Waverley. The company's sundries display included a complete line of accessories of all kinds.

F. B. STEARNS CO.

Red is the prevailing color for finish of cars and decorations. A huge red electric sign with the single word Stearns attracts immediate attention. The display is simple but effective, consisting of a Stearns Suburban car or single cylinder tonneau, and the touring car, a double cylinder machine of which only the chassis is shown. The Stearns company says that it believes in quality rather than quantity, and the output this year will be limited to 100 cars, the majority of which have already been sold.

HOFFMAN AUTOMOBILE & MFG. CO.

As was the case at the New York show, the Hoffman company receives favorable comment

opening day. It will be displayed later in the week, however. It is equipped with a 35-horsepower 4-cylinder gasoline motor hung vertically in front and the transmission is of the bevel gear type.

SHELBY MOTOR CAR CO.

The Shelby exhibit was one of those delayed by poor transportation facilities and the cars were not placed until late in the evening. They came directly from the New York show and include a 20-horsepower gasoline touring car and a combination two and four seater equipped with a 10-horsepower motor. The company also has a machine on the streets for demonstration purposes and Secretary E. L. Sander-son keeps it constantly on the run.

AUTOCAR CO.

Opening day nothing had appeared but the sign.

OHIO OLDSMOBILE CO.

This concern, which in point of sales has long been the leader in the Cleveland aggregation of dealers, has the latest line of Olds, direct from the New York show. The new touring car and the coupe have not been shown in Cleveland heretofore, and the remarkable reputation already attained by the little Detroit production is bound to make the new departures popular. In fact, Manager Owen has already booked orders for about twenty of these machines, with nothing to show but pictures.

FOSTER & CO.

This company, which has recently opened a fine retail establishment in the Y. M. C. A. building, is local agent for the General Automobile & Mfg. Co. and the Ajax Automobile Co. The Ajax electric run-

about is shown in Cleveland for the first time. The complete line of Generals did not arrive from New York in time for the opening day, and the local factory furnished two runabouts, one with a tonneau and the other without; also a chassis of the same machine. Later in the week the company's new touring car will be shown.

OHIO MOTOR CAR CO.

This is another newly organized retail concern. It has established a store in the Pythian Temple, where it will handle the lines of the International Motor Car Co. and of the Northern Mfg. Co. Only the touring car built by the first mentioned company was displayed at the opening.

WARWICK & BISSELL

A new local retail concern which has the agency for the line of the E. R. Thomas Motor



MOTOR AGE

SPECIAL EXHIBITS TRAIN IN CLEVELAND FREIGHT YARD

on its low-priced, high-class machine, the "general utility car" equipped with a tonneau and selling at \$900 being considered a bargain. The company also features a powerful and well built steam machine.

H. B. WICK & CO.

The Youngstown concern was scheduled to appear with its now famous "Blue Goose," which is classed among the highest priced machines on the market, but at the time of writing its space was unoccupied.

ROGERS & THACHER

This is the latest concern to enter the ranks of Cleveland manufacturers. Mr. Rogers was formerly with the Winton company and his company has recently established a factory in which it will be enabled to turn out about five cars a month. Unfortunately the company was unable to fully complete its car for the

MOTOR AGE

Co. The display was not complete at the opening.

SUPPLIES AND SUNDRIES

Collister & Sayle, the well-known Cleveland sporting goods house, is identified with the automobile trade through the sale of a number of lines of supplies, such as hampers, horns, bells, goggles, lifting jacks and lamps, and these are shown in profusion. The firm has taken advantage of this occasion to display to the public a number of other lines of goods, among them being talking machines, skates and bicycles.

WALTHAM MFG. CO.

The Orient buckboard will be shown later in the week.

L. J. MUELLER CO.

A new local supply house which proposes to supply to the manufacturing trade a comprehensive line of gasoline automobile material. The following are shown: Hussey radiating coils, circulating pumps, steering wheels and mufflers; Aultman radiators, Weeber mufflers, Lobe circulating pumps, Splittorf coils and switches, Raymond brakes, Dayton compensating gears, Herz spark coils, Champion transmission, Baldwin and Duckworth chains, running gears and bodies.

B. F. GOODRICH CO.

More striking than the piles of clincher, single tube and solid tires which constituted the stock in trade at this stand was the aggregation of beautiful Goodrich girls confined in handsome frames. The Goodrich clincher tire is a great favorite in this territory.

THE NATIONAL CARBON CO.

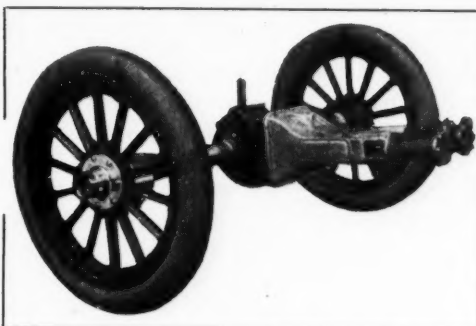
The display is practically the same as that shown at New York, consisting of a pyramid of Rex closed circuit and open circuit cells, spark coils and other devices for sparking hydro-carbon motors being shown.

PITTSBURG REDUCTION CO.

The Cleveland branch of this manufacturer of aluminum products displays its line of white metal goods in a striking black booth. Aluminum is entering very largely into the construction of automobiles and the line of parts is interesting and instructive. Samples of crank cases, hoods, tonneau seats, motor cases and other parts are shown.

D. E. FOOTE RUBBER CO.

This company is Ohio representative for the International Automobile & Vehicle Tire Co., and in addition to its line of bicycle and automobile tires, there is a decided innovation in the exhibition line in a vulcanizing outfit in actual operation.



MOTOR AGE

Geneva Direct Drive

KELLY HANDLE BAR CO.

In addition to its well-known line of Kelly handle bars and steam generators, the company is showing a new tubular burner for steam machines. The device has been in use for the past year on the Geneva steam machine and the Kelly people have acquired the right to manufacture for the trade. It is made with a continuous perforated steel tube with a cross tube below that is connected to each coil, giving an even distribution of gas over the entire surface of the burner. The walls of the burner are uniform in size and it is claimed it gives a powerful fire. No damage can result should the burner become red hot and there is no possibility of back firing, as there are no air tubes swaged in the coils. The burner casing is constructed with a solid steel bottom and as the air is taken in from the ends it is impossible to have a down flashing or an overlapping fire.

20TH CENTURY MFG. CO.

The New York exhibit is used en masse. The background is brown velvet with the name of the company in gold letters. Automobile and bicycle lamps are shown.

VEEDER MFG. CO.

The chief feature at this stand is a wheel and section of front running gear to which is attached a tachometer, or speed indicator. A centrifugal pump throws a column of oil into a dial on the dash, recording the speed of the car. A number of odometers are shown in operation. Some of them are attached to motors and run at the remarkable speed of 45 miles per minute.

DIAMOND RUBBER CO.

The line of tires is the same as shown at the New York show. Single and double tube tires and cross sections are displayed. The company has recently opened a salesroom and repair shop in Cleveland.

WESTINGHOUSE ELECTRIC & MFG. CO.

Electric automobiles are charged free at this stand. The exhibit consists of a number of different styles of motors, controllers and

switches. A motor generator set is in operation and a new feature is an indicator which is attached to the dash of the vehicle and records the condition of the battery.

JOHN H. GRAHAM & SONS

New Departure brakes and bells in many patterns are tastefully shown.

FISK RUBBER CO.

A full line of Fisk single tube and of the new detachable tire are shown, the latter especially attracting attention.

THE SHOW ATTRACTS BUYERS

Attendance Continues to Be Good and Manufacturers Report Encouraging Business

Cleveland, O., Feb. 4—The show is now in full swing. The delayed exhibitors have placed their goods and the interior of Gray's armory presents both a lively and a businesslike appearance. The attendance is in keeping with the acknowledged interest of the Clevelanders in the products for which its own manufacturers are noted, and it is not merely an attendance of curiosity and entertainment seekers. The patrons are interested and scrutinize the exhibit closely.

Sales have begun and the exhibitors seem satisfied. It is noticeable also that many dealers and prospective dealers from surrounding towns and cities are on hand. Most of these are not buying hurriedly, but are making scrutinizing examinations of all of the cars shown. The general public, too, takes more than a passing interest in the vehicles displayed. There is not the multitude of interesting things to see which crowded the New York show, and a visitor coming in for an evening or an afternoon feels that he can spend sufficient time at each stand to examine the displays thoroughly without losing the chance of seeing other things.

It is a nice local exhibit. The personality of the local manufacturers and the local agents for cars made elsewhere lend a friendly feeling to the show that does not exist to so great an extent in the larger eastern and western metropolitan shows. Also the exhibitors are talking to persons with whom they are in close touch, and the feeling is prevalent that even should the direct sales of the week not be stupendous a little well executed follow up work will produce a gratifying addition to the business due to the show.

Taken as a whole the show is a success and is indicative of the fact that Cleveland ranks high as an automobiling as well as an automobile producing center.



MOTOR AGE

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A METAMORPHOSIS

Any automobile show—that just closed in New York or that just to be opened in Chicago—is a chapter in the evolution of the bicycle salesman. Much as occasional members of the automobile trade refer to the bicycle trade as a cheap thing of the past, it is everywhere evident that a great part of the effort now being exerted to establish the commercial welfare of the automobile is made by men who have been lights of a greater or lesser degree in the cycle trade. Men who have urged the respective merits of different bicycles at the old-time cycle shows; men whose names have been identified with bicycles of world wide prominence; men who have made, sold and used bicycles under all the varying conditions of the American cycle trade and sport—these men are seen at automobile shows espousing the cause of prominent automobiles.

They may be makers in a mechanical sense, makers in a commercial sense, sales managers, advertising managers or salesmen. They are at the automobile shows selling automobiles and their influence is great.

Much of the best effort of the automobile trade has grown out of the cycle trade. And many a man of those who help to make automobile shows successful can at each show look backward to pictures in the same setting but which tell of a wonderful bicycling fervor instead of the now radiant enthusiasm of automobiling. Entirely or partially lost to the bicycle industry, the services of these men are

becoming of incalculable good to the automobile industry.

They have learned many lessons of shop practice and business methods paid for by the cycle trade—the cost of learning being saved the automobile trade. They have stepped from one field gracefully into another to which they were rightly heirs. They exhibited a forethought the result of which has been placing them in an enviable commercial position while the carriage trade has been sleeping. They bid fair to form a future important element of the whole road transit trade.

It would not be surprising to see at the first annual show of the American Association of Air Ship Manufacturers the same cycle-automobile tradesmen proclaiming the merits of the different cloud cars.

THE COMMON CARRIAGE

Many people look upon the automobile as a complicated piece of machinery. They conceive it to be an affair the understanding of which implies a technical education or a post-graduate course in practical experience. They are all wrong. The automobile is as simple as the horse, and when once its habits are learned, a full knowledge of its character and ways is better assured.

The automobilists of today form a class. The automobilists of the next generation will no more constitute a class than do the buggy riders or bicycle riders now. The art of driving an automobile will be no more an art than the art of driving the family horse to church on a bright Sunday morning. For the automobile will be the family conveyance.

We are fast becoming a mechanical people and the man who understands the correct handling of a monkey wrench is no longer a genius. It is becoming a substantial part of the education of every young man to learn the principles of mechanics. The meaning of ordinary mechanical terms is not relegated to the work shop and many of the men who sit at the office desks could step into the shop and perform its especial tasks should they chose.

In nearly every field of out-door pleasure a knowledge of mechanical work is essential. The automobile is one of the greatest educators along this line. Just as the bicycle induced cyclists everywhere to study the construction of bicycles, so the automobile in even a more marked degree induces the automobilist to study its construction carefully. Especially

in the case of young men and boys are the principles of operation of the different motive powers and the strictly mechanical elements of the automobiles being rapidly absorbed.

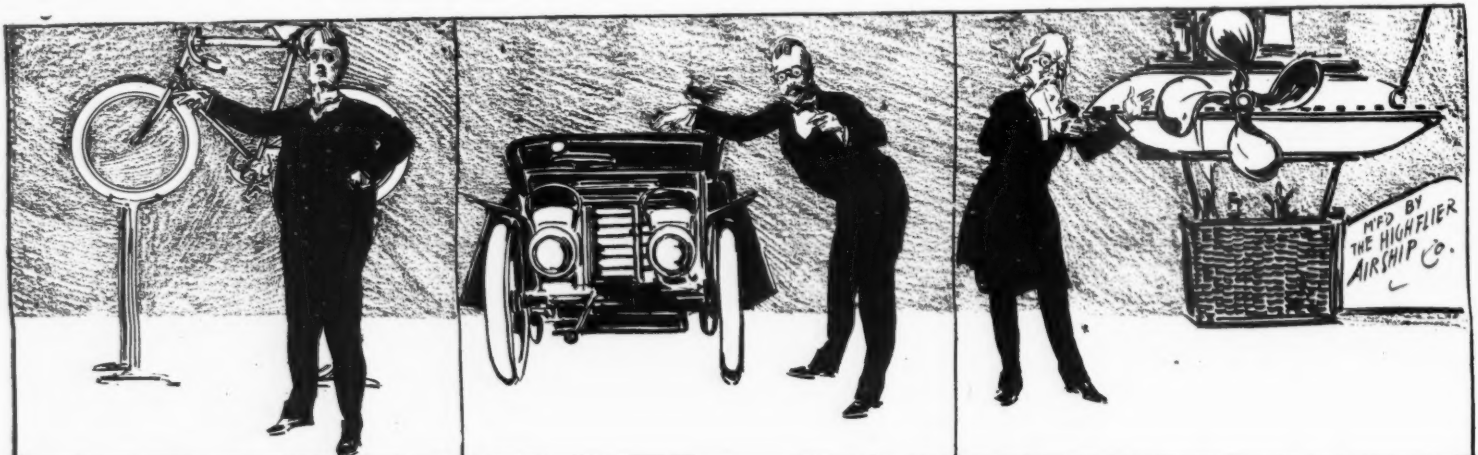
The whole trend of education being to develop the mind and the hands mechanically, and the automobile—as a popular instrument of pleasure and business—being a magnificent educative medium on account of the attractive manner in which it presents mechanical subjects, it is reasonable to suppose that another generation will find the public nearly, if not quite, as well informed on the operation and care of motor vehicles as on the care and management of horses.

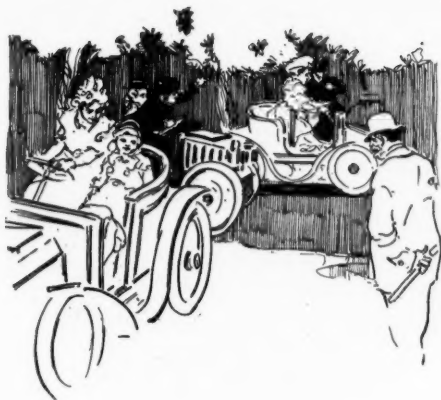
Then the purchase of an automobile will be no great undertaking to bring into play all of the available advice and interest afforded by the community in which the purchaser lives, and the beginning of usage of the car will be no departure from every-day occurrences. Even the usefulness of the exhaustive instruction book will be lost, for the automobile will have become a thing of ordinary usefulness, like the sewing machine or the bicycle. And just as the average cyclist understands the care and ordinary repair of his bicycle, and just as the average woman understands the care and operation of her sewing machine, so also will the average man understand the care and operation of his automobile.

The automobile will be a family carriage—the family carriage—understood by the different members of the family and used by them all.

AMERICAN MOTOR LEAGUE

Born in a manger and nurtured on an empty bottle, the American Motor League has clung to existence with a tenacity which is equaled only by that of its virtual founder. Its drooping childhood was given a reviving touch of the great tonic of enthusiasm last year at the Chicago show when a re-organization occurred. This year at the annual meeting at the New York show the lack of increased enthusiasm showed that the league had not been pushed vigorously during the year; that the early efforts of last year had dwindled into inactivity. But this year the league has in its president a man who has made one national league famous and great. He may start the work of rendering this league as useful and great as its objects deserve.





For the American Motor League is useful. Long after clubs and organizations of clubs have passed the full bloom of their greatness there will be still a field for an organization of individuals, country wide and far reaching in its purposes. Clubs are essentially organizations of the city. The American Motor League stretches out into the villages and open country and embraces all who are interested directly or indirectly in automobiles.

Club life entails heavier membership fees, greater maintenance cost and greater enthusiasm to keep alive the coals of prosperity. A big national organization of individuals needs only a nominal financial assistance from its members and imbues enthusiasm by its very size and scope. The city automobile club has the competition of the many other city clubs. Without such things being adjunct to its purpose it must furnish the club facilities already provided by the other clubs. It touches the social phase of club life. A national organization of individuals exists for a specific purpose and to accomplish this is not forced to take on the burden of side lines of endeavor.

The American Motor League is a practical, useful, conservative organization. It has a well established purpose in American automobiling. Pride for or enthusiasm in automobile clubs should not lead automobilists to forget the American Motor League or withhold from it the support of their membership and interest in it.

ONE LEVER CONTROL

On the face of it the proposition of controlling an automobile with one hand and one lever is attractive. It looks simple. To be able to manipulate the throttle, spark, speed change, clutch and brake controlling mediums with the same lever forms a plausible talking point for the salesman. It certainly forms the acme of combination of factors. It is a praiseworthy mechanical achievement. It shows ingenuity coupled with practical mechanical ability.

But to the very extent that it reduces the number of controlling mediums it increases the amount of mental effort necessary to control the vehicle. It is far easier for a driver to realize at all times that one lever is for one purpose, another for a second purpose, and so on, than it is for him to memorize the different qualities of the same lever. The successful operation of one lever which accomplishes many results is something like touch typewrit-

ing with the eyes shut—an accomplishment of but little real value in consideration of the energy necessarily exerted in attaining proficiency.

Several levers for several distinct uses are visible and their uses easily grasped. Several purposes for the same lever, and a variety of delicately shaded movements therefor, create a necessity for mental rather than visible distinctions. With a chart of the various movements on the dashboard a beginner in automobiling might master the multiple movement lever only to find himself deficient with the chart gone and a case of mental merry-go-round to face when in some tight corner necessitating quick, decisive and correct action.

The one-lever control proposition resolves itself naturally into the question as to whether the greater manual effort required in manipulating several levers is of more importance than the greater mental effort required to thoroughly master one lever which serves several purposes. An advocate of the single lever might argue that a person could by practice become unconsciously familiar with the different uses of the lever and that hence the operation of the lever would in reality be as simple as it seems casually.

This may be so, but it includes the personal equation. To some people the mental grasp of such a situation is comparatively easy, while to others it is difficult. Also, some persons can under normal circumstances manipulate such an element as the single-lever control system, but under the least excitement lose their presence of mind and are helpless mentally for just long enough to cause trouble.

For a clear headed, thoughtful man the one-lever control system furnishes a convenient method of operating an automobile. For one who is liable to become "rattled" the chances of incorrect handling are probably greater than with the ordinary system of independent control levers.

MOTOR AGE, and probably all other trade papers, frequently receives letters to the following effect: "We are sending you under separate cover two electro's of our machine. Use the smaller one in our ad and the larger one in a write-up in the reading columns." Without attempting to discuss the good taste of advertisers in presuming to direct the editorial conduct of the paper, it is, if nothing else, humorous to note the spirit of assumption that prompts the purchase of only enough space in which to use a small cut, while the free display of a large cut is requested. No paper objects to fully illustrating as many of the products of the trade as it can, but the extent of illustration is determined by the judgment of the editorial department and not antithetically according to the minuteness of the cut which is used in advertising spaces. It is hardly presumable that the smaller the ad and the ad cut the larger the freely displayed cut in order to strike an even balance.

In another part of this issue is given a table showing the speeds in miles per hour and the per cent grades that can be climbed by each of the two patterns of the Mercedes-Simplex car, equipped with driving sprockets

of different sizes. These tables are valuable to intending purchasers of the Mercedes and this system of rating the car might be well adopted by American manufacturers—provided, of course, that the truth be adhered to in compiling the ratings. Otherwise the buyer would be worse at sea regarding the gearing desired for the class of work to which the car would be subjected than were no comparative tables of any kind furnished him.

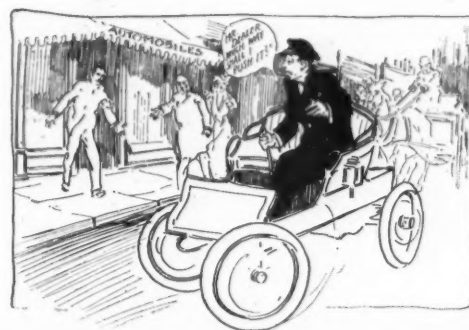
One way to write a "fetching" advertisement—combine the catch phrases of several current advertisements in automobile trade journals something in this manner: We sell automobiles and show the way to be one year ahead of them all with a new one, which is easily the best car in America—pronounced by an expert "Best I ever saw." If you do not believe that it is America's leading automobile ask the man who owns one. It was a show favorite and it did make a hit. It stands the test without blemish. It is a searchlight flash—a revelation; it outclasses them all. See it before you buy. You need it. Will you think of it?

The Carriage Monthly in a recent issue makes a strong bid for securing the patronage of the automobile trade by the publication of an advertisement of the great American Automobile Co., better known around Racine, Wis., than anywhere else. To the credit of the Carriage Monthly, however, it may be said that Mr. Pennington has not yet been well exploited in the carriage trade and his methods of operation may therefore not be well known to that trade nor its journals.

Averaging the speeds of all of the different kilometer and mile records for different types of vehicles from the lightest motor bicycle to the heavy racing automobile, a speed rate of over 65 miles an hour is obtained. It will take a fast car to win the Gordon-Bennett cup race. Another deduction is that the holding by the railway train of the speed record for all means of transportation is doomed.

In sending out the time schedule of the special train secured by the National Association of Automobile Manufacturers to convey the exhibits from the New York to the Chicago show, the compiler thereof asserted that the train would "lay" at Syracuse, Buffalo and Toledo for one day each. This is in line with the move on foot in Rochester to run a combination chicken and automobile show.

That no man can serve two masters might mean that it is hard to hold the jobs of city alderman and president of an automobile club at the same time.



ON THE ROAD TO DOURDAN



Henri Fournier

MOTOR AGE

As a short distance speedway for automobiles it is probable that no road in the world excels the official record road of the Automobile Club of France. In the midst of a land of good roads it was chosen as that most suited in all respects for straightaway record breaking, not only enabling fast performances, but rendering such performances genuine beyond dispute on account of the almost theoretically level character of the stretch.

REASON FOR THE ROAD

The existence of the road as an official stamping ground for speed performers is due entirely to the desire of the Automobile Club of France to place all record trials on an equal basis. This desire, in turn, is the result of the Jarrot kilometer trial last spring in which Vanderbilt's then existing record was broken only that the discovery might be made that the performance had occurred on a decline of about 3½ per cent.

With an official road on which all French records to be recognized must be made and timed by the officials of the Automobile Club of France it was rightly conceived that future squabbles would be obviated. The equity of compelling all record seekers to make their trials on the same road may not be as appreciable in other countries as in France, yet the character and uses of the French road are of international interest, on account of it being the first road in the world for regular use of which for speed purposes automobilists have received governmental sanction.

The road was selected by M. Tampier, the official timekeeper of the Automobile Club of France, who is well known in European racing on account of having acted as the representative of the A. C. F. in the organization of such events as the Paris-Toulouse, Paris-Berlin and Paris-Vienna races, and who is now engaged in an investigation of the condition of the different roads between Paris and Madrid with a view to choosing a route for the coming Paris-Madrid race.

PERFECTLY STRAIGHT

The official record road connects St. Arnault with Dourdan, a small town about 40 miles from Paris. The road is on a plateau and presents a substantially straight course for about three miles. The surveyed mile and kilometer are to all intents level, there being a grade of only 7.8 inches in the mile and of only 1½ inches in the kilometer. The line is absolutely straight for 4 kilometers, at the limits of which are turning points which permit the cars to be brought around without

backward manipulation. The roadway is 40 feet in width without a break in the surface, and is sufficiently arched to shed water rapidly. Its natural qualities are also excellent for automobile racing. The entire stretch is closely protected by dense woods which make it impossible for any but an aggravated north-west wind to penetrate to the disturbance of racing.

RACES TO BE RUN

The Automobile Club of France has secured from the government permission to erect four poles, marking the ends of the kilometer and mile stretches. In the spring the surface will be improved by the application of petroleum or tar that mud and dust may be entirely suppressed.

So successful have been the record trials that have been made on the Dourdan road, which is now regularly open to the automo-



MOTOR AGE

M. Augieres

SMALL CARS—Thellier, Passy-Thellier car, 58 seconds.

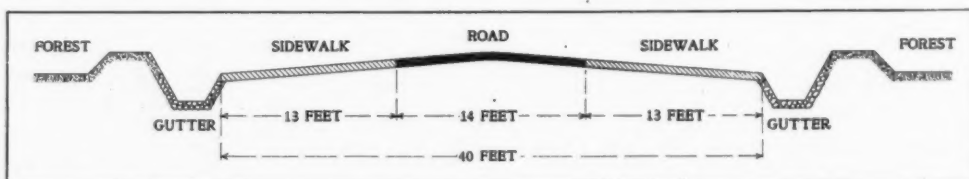
MOTOR CYCLES—Rigal, Buchet tricycle, 53 3-5 seconds.

HEAVY MOTOR BICYCLES—Derny, Clement bicycle, 53 2-5 seconds.

MODERATE WEIGHT MOTOR BICYCLES—Fournier, Carreau bicycle, 1 minute, 5 seconds.

LIGHT MOTOR BICYCLES—Derny, Clement bicycle, 1 minute, 5 2-5 seconds.

These marks happen to not only be



MOTOR AGE

CROSS SECTION OF DOURDAN ROAD

bilists for speed trial on three days of each week, that the A. C. F. contemplates the holding of several race meetings here during the summer.

DOURDAN ROAD RECORDS

The records which have been broken and established on the Dourdan road since its opening are as follows:

THE KILOMETER

HEAVY CARS—Augieres, Mors car, and Fournier, Mors car, 29 seconds.

LIGHT CARS—Thery, Decauville car, 30 seconds.

SMALL CARS—Thellier, Passy-Thellier car, 36 1-5 seconds.

MOTOR CYCLES—Rigal, Buchet, tricycle, 32 3-5 seconds.

HEAVY MOTOR BICYCLES—Derny, Clement bicycle, 33 1-5 seconds.

MODERATE WEIGHT MOTOR BICYCLES—Lamberjack, Griffon bicycle, 39 2-5 seconds.

LIGHT MOTOR BICYCLES—Derny, Clement bicycle, 39 4-5 seconds.

THE MILE

HEAVY CARS—Augieres, Mors car, 46 seconds.

LIGHT CARS—Thery, Decauville car, 48 3-5 seconds.



MOTOR AGE

Sweeping off the Leaves

Dourdan road and French records, but world's records as well.

The grand average of speed of the existing mile and kilometer records made on the Dourdan road is 106.084 kilometers or 65.772 miles per hour. The record made in the fastest time is the mile record of 46 seconds which is at the rate of 125.921 kilometers, or 78.071 miles per hour.

SPEED COURSE FOR GERMANY

Emperor Gives His Assistance to Building an Automobile Road Through Grunewald Forest

Berlin, Germany, Jan. 26—The automobilists of the German capital are highly gratified by the formal announcement that the long sustained project for a large automobile race course has received royal patronage, and that its early construction is assured. The emperor has approved the plans of the promoter, Herr Geitner, and a speed course 65 feet wide and 12 kilometers, or 7.4 miles in length will be laid out in the Grunewald reservation. It seems that this action on the part of Emperor William is due to his desire to have Germany rank with other nations in speed achievements, without being compelled to sanction unrestricted fast driving on the boulevards and roads.

The route is through the most picturesque part of the old Grunewald forest and is to be reserved absolutely for the use of automobilists. The road surface is to be of the most approved kind and every attempt will be made to construct an unexcelled course. It is probable that international contests will be arranged to occur upon it.

Plans for the circular track and permanent exhibition building in Berlin are also progressing rapidly and it is expected that the work will be well on toward completion by summer.

BRIGHT CALIFORNIA SCHEME

Pasadena, Cal., Jan. 30—The members of the recently organized automobile club, carrying out their promise to accomplish something

of benefit have conceived a unique scheme for securing a good roads fund. They will inaugurate next week, and continue for about two months, a series of tri-weekly tours for the public from Pasadena to Pomona and return. Two or more large touring cars, according to demand, will leave Hotel Green at 9:30 o'clock on Mondays, Wednesdays and Fridays, each car carrying three passengers and arriving at Pomona at noon, where luncheon will be served at Hotel Palomares.

The distance to Pomona is 30, miles, making a round trip of 60 miles. The main highway, which is one of the best roads in this vicinity, passes through one of the prettiest sections in southern California.

It is anticipated that the demand for seats in the automobiles will tax the capacity of the club members offering their services to this scheme, as an automobile tour under such circumstances cannot fail to be attractive to many tourists, who have never ridden in these large touring cars.

The entire proceeds of the tours will go toward a good roads fund, and the co-operation of the public will indirectly create a sentiment in favor of the improvement of our highways and eventually lead to legislative appropriations for this most important purpose.

LATE WINTER CLUB RUN

New York, Feb. 1—Members of the Automobile Club of America are to celebrate Washington's Birthday by a rendezvous at Lakewood, N. J., to wind up with a club run home. Notices were sent to the members last night suggesting that they meet at the Lakewood Hotel, at 6 o'clock on the afternoon of Saturday, February 21, reaching the rendezvous independently at their pleasure.

A banquet and such other functions as the Lakewood cottagers and hotel people are likely to arrange for will furnish the Saturday night entertainment. Sunday is to be devoted to tours over the fine Monmouth county roads. It is natural to suppose that Georgian Court, the winter residence of George J. Gould, a member of the club, will be visited, and that the new speedway built largely by his contributions will be tested.

The return run, which will really be the chief event of the late winter or early spring outing, will start at 9 o'clock on Monday morning. The homeward bound route will be by way of New Brunswick and Newark. Coaching and automobile tourists, who have made the trip this winter, report the roads to be in fine condition most of the way. The distance is 78 miles.

The much debated future of the Remington Automobile & Motor Co., of Utica, N. Y., has been settled by the decision to sell the plant at auction February 11.

READY FOR THE SCRIMMAGE

Entries for Positions on America's Cup Team Closed—Entrants Await A. C.

A. Racing Committee's Order

New York, Feb. 1—Entries for places on the Automobile Club of America's international cup team closed yesterday, with no additional candidates presenting themselves. Accordingly five machines will report to the racing committee on April 11 in this city ready for such tests as may be imposed upon them to enable the committee to make choice of two of the five to fill the vacant places on the team, Alexander Winton having been already chosen in recognition of his having been the first to volunteer to build and drive a racer in such a contest and so make American participation in this year's race possible.

THE ENTRANTS

Alexander Winton and Perry Owen are having twin Wintons built for them at the Cleveland factory and L. P. Mooers reports satis-

is also understood, although the strictest secrecy as to the proceedings was observed, that MOTOR AGE's suggestion of a combination of hill climbing, mile sprinting and 100 miles speeding was considered.

DECISION WANTED

The opinion prevails among those who have followed racing and have occasion to interest themselves particularly in the coming contest that in justice to the entrants, the club, the industry and the American public, whose reputations are at stake in this international race, the conditions of the trials should be speedily announced, so that entrants may be prepared for the tests they are to face and not be subjected to a surprise at the last moment. It is realized that whatever may be the character of the tests determined upon, there are pretty sure to be differences of opinion and criticisms, and that these had much better be gotten over with before the trials than be left to breed discontent after the team has been chosen and is on its way to the battle field.

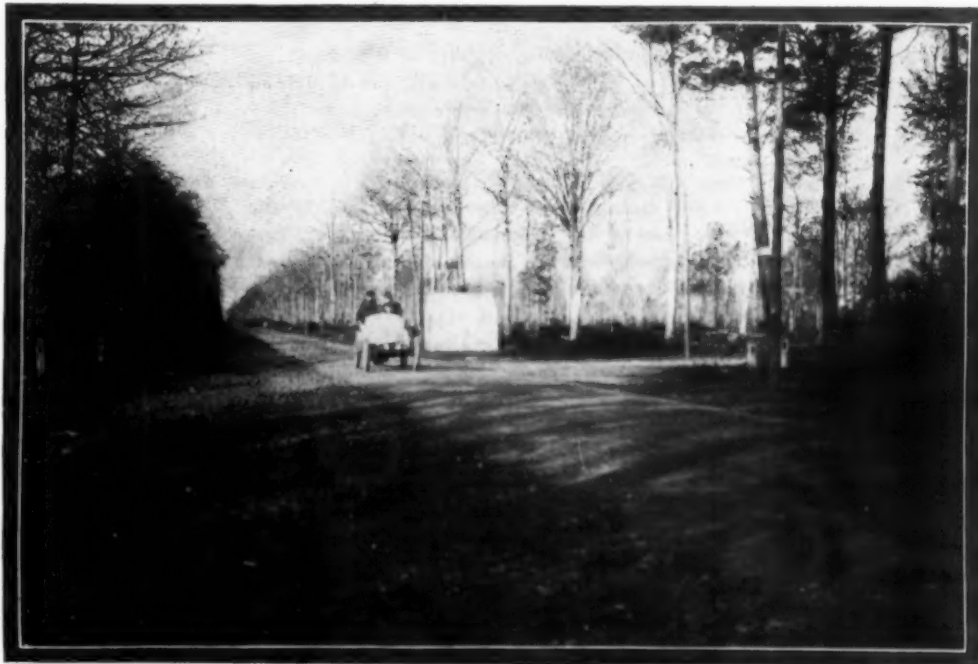
SECRET TRIALS POSSIBLE

Rumors that the test would be a mere mile

sprinting trial have been laughed at and common sense opinion has cleared the committee of any intention of perpetrating such a farce.

The silence of the committee on the subject has given rise to a guess that perhaps the members of the committee may accompany the machines on secret road trials of sufficient length and severity to give them a satisfactory line on the relative merits of the candidates under conditions approaching those of the race itself. The club's attitude on speed limit observance, however, would stand in the way of such a solution.

From every point of view a series of tests seems correct.



MOTOR AGE

A SPEED TRIAL ON DOURDAN ROAD

factory progress on his Peerless. H. S. Harkness is having his racer made to order after designs of his own and will give no particulars of its construction or place of manufacture. C. W. Matheson, of Grand Rapids, Mich., has entered two machines bearing his name. Who will drive them is not yet announced, though Mr. Matheson had a talk on the subject with a well known American chauffeur, a former professional cyclist recently reinstated as an amateur.

Secretary Butler said yesterday that he had received as yet no instructions to call a meeting of the racing committee, though he supposed now that the entries had closed a meeting would not be long delayed.

MUCH CONJECTURE

Candidates and others interested are beginning to ask what the tests are to be and when their details are to be announced. At the last meeting of the committee, at which the dates of the closing of the entries and presentation of the machines for test were fixed, Percy Owen and H. S. Harkness, two of the entrants, were called into consultation, presumably as to the character of the tests.

AUTOMOBILE WRITER DIES

New York, Feb. 1—George E. Stackhouse, athletic editor of the New York Tribune, long known as a writer on cycling and recently on automobiling, died on Friday of acute indigestion after a short illness. Mr. Stackhouse had been connected with the Tribune during the entire 23 years of his newspaper career. He has held high positions in cycling, having been an L. A. W. representative and a member of its racing board. He leaves a widow and two daughters.

LOW WON OVER

Mayor Low, of New York, at a public hearing in protest against his approval of the Marks ordinance recently passed, giving street sprinkling over to private contractors, instead of placing it under the control of the Street Cleaning Department, has announced his intention of vetoing the measure, which has been so strongly opposed by automobilists, cyclists and other road users.



THE STANLEY SHOW—LONDON

EXHIBITS NOT REPRESENTATIVE

London, England, Jan. 21—The first venture of the Stanley Club in the way of an exhibition devoted purely to automobiles, motor cycles and accessories opened its doors for a private view on Thursday, and the public was admitted on Friday. The venue chosen was Earl's Court, a little piece of railway encircled land which has seen many exhibitions of recent years. But those exhibitions have been merely a secondary consideration as a rule. The grounds, the lights, the music, the promenade around the lake, the pleasures of the chute have been the great attractions at the summer exhibitions, so that Earl's Court, in the winter, is another place entirely, and those ephemeral delights have played no part in attracting the public to the Stanley automobile exhibition. Those who pass through the turnstiles do so with but one object, and that is to see the exhibits and to make their purchases and place their orders.

Cold days were the first three or four, but actively moving about one scarcely felt the bitterness outside. But inside the cold of the Palais de Beaux Arts on the first day of the Paris show was child's play to it; one reason being that at the latter place there was a freedom from draughts. An attempt was made to temper the cutting atmosphere by placing gas stoves at intervals throughout the two show buildings.

From the mere scenic point of view Earl's Court is impossible; but, after all, a fine general appearance, beyond making an initial favorable impression, may be of little use. Most patrons go to see the cars, their mechanism and their finish.

The exhibition is hardly representative of the entire British automobile trade, many of the manufacturers having withheld their displays for the Crystal Palace show. There are several French and German cars shown and two American vehicles, the Toledo steamer and the Oldsmobile. The English light cars are fairly represented and a pleasing exhibition of heavy cars is made, but the show does not approach magnitude in its proportions. The Rochet and Clement stands were brought from the Paris show in a rather dilapidated condition and, towering above the flag draped English display, give the whole view a somewhat grotesque character. The motor bicycle display, while ample, lacks attractiveness on account of being a virtual reproduction of the displays made at the two cycle shows earlier in the winter.

AMONG THE EXHIBITS

The Waddington voiturette, a well designed car, is driven by a 6½-horsepower Linon engine, with the usual sliding gear system and a knuckle jointed shaft to the differential. Three forward speeds and a reverse are provided, and on the top speed 25 miles an hour can be attained. The car is of large size, having a long wheel base, and with a wide platform at the rear. The seat is wide and comfortable, and the space beneath it is devoted to tools and sundries.

Three specimens of the German Wartburg



car are exhibited by the English agents. Two of the cars have accommodation each for two passengers, and have the engine placed at the rear. This is a twin cylinder motor and drives through gearing direct to the rear axle. The third car has an extra spider seat, with the engine placed forward under the bonnet. The Wartburg is one of the best finished of the cheap cars. Wood wheels are provided, and the carriage body and upholstery are particularly good.

THE LIGHT ROCHET

On the stand of the New Automobile Co. are shown two 6½-horsepower Rochet voitures, the identical machines which were exhibited at the Paris show. The cars compare well with anything of a similar power. They are comfortable, well built and the power is ample for any hill in this country.

THE STAUGHTON

One of the best little cars in the show is the Staughton, which is being marketed in this country by the British Germain Motorcar Co. It is the production of Prosper Lambert, a well-known French maker. The engine is of one cylinder, developing 8-horsepower, with an automatic governor acting on the throttle valve. It is placed forward under the bonnet, and the method of power transmission is by bevel gears to a live rear axle. A noteworthy feature is the fact that the brakes on the rear wheels are of the latest internal expansion type. The body is attached to a framework of channel steel, which is carried on long semi-elliptic springs at front and rear. To take the drive distance rods are introduced between the rear axle and the main frame on each side.

The 5-horsepower single cylinder Clement is shown by the British Automobile Commercial Syndicate. The car is the same as that shown at the Paris exhibition.

THE UNION

The Union Motor Works, Nuremberg, Germany, shows a chassis, with 4-horsepower motor, and fitted with its friction gear drive, which enables any speed from 6 to 30 miles per hour, and reverse drive, simply by turning a hand wheel. The drive is taken by chain to the rear axle, the differential being mounted in the gear wheel hub on one side. The ignition is effected by a magneto generator and cylinder make and break, actuated by a striker on top of the piston. A feature of the motor is the ease with which the cylinder cover can be removed to inspect the make and break. A clutch action is combined with the friction

gear, enabling the car to be thrown in and out easily and certainly.

THE ELECTRICS

Shippey Bros. show several electric vehicles of 4, 5 and 6-horsepower. The 4-horsepower is a doctor's hooded phaeton, fitted with a 100-volt battery, giving power for 30 miles a day on one charge. It has three speeds, a special controller, a combination ampere and volt-meter, and is speeded for 4, 8, 12 and 16 miles per hour.

THE M. M. C.

The Motor Mfg. Co. is showing nothing smaller than its 8-horsepower single cylinder car. The work on this is particularly good. The engine is placed forward under the bonnet, but instead of being central, as usual, it is placed a little to the left of the center. This gives ample room on the right-hand side for the steering gear. The car is provided with three speeds forward and a reverse, the gearing is always in mesh. The car is driven on the countershaft by chains. Powerful brakes are provided. The body of the car is particularly comfortable.

THE BABY PEUGEOT

A little family of "babies" is shown ranged along one side of the Queen's Palace, and very charming and dainty is their appearance. The new Baby, with its wood wheels, its three forward speeds and a reverse, should be a popular car, for the purchaser gets a 5-horsepower car complete in every detail, including lamps, horn, foot pump, spare parts, repair outfit, etc., and, moreover, the car is fully guaranteed for six months. It is a good hill climber and is in every way a comfortable and serviceable car for two people.

THE LANCHESTER

The file of Lanchester cars contains all sorts and descriptions of vehicles. But in every case the engine and the underbody is identical. The Lanchester car is propelled by a 10-horsepower two-cylinder engine, the cylinders being horizontal and being placed amidships and athwart, so that the cylinders are on either side and the crank shaft and fly wheels are in the center. The cylinders are air cooled. Air is drawn in through vents formed on the sides of the car, and is passed round the cylinders by rotary fans. A magneto ignition of special type is used and the lubrication is automatic, oil being conveyed to each part by a deliberate mechanical movement of a rotary supply pump. The transmission to the wheels is by worm gears.

MISCELLANEOUS

The London Motor Garage shows the 12-horsepower Magnet and the Pipe car. The latter has proved itself in contests abroad; it has crossed the Sahara desert under the guidance of Baron Pierre de Crawhez; it distinguished itself in the Circuit des Ardennes, and at the Spa hill climbing contest, where it carried off the principal prize of the meeting. It also earned a gold medal at the Paris exhibition.

Charles Bardies shows the genuine French Bleriot acetylene lamps for motor cars and a special lenticular projector, in which the front glass takes off for cleaning purposes more easily than with the old type.

Steiner & Co. are showing 40 different patterns of horns, both for motors and motor cycles. They have novelties in a lamp and

horn combined, oil or acetylene, a horn with a revolving sounding bell, allowing the sound to be projected in any direction.

A. W. Brightmore shows a new type lorry to carry 5 tons. The front wheels are both driving and steering, and it is practically a power steerer. The fore carriage is self-contained and can be detached from the rear part. The machinery of this lorry is accessible, even when loaded.

The Velox Motor Co. shows a 4-cylinder 12-horsepower Velox car, which has several novel features, one of which is an adjustable steering pillar, which can be altered to different heights or angles to suit individual drivers. By unscrewing four nuts only the gear box can be entirely removed without interfering with the rest of the mechanism.

CRYSTAL PALACE SHOW LARGE

Over 600 Automobiles On Exhibition at London Display—American Cars Find Favor

London, England, Jan. 30—[Special Cable.]—The automobile show which opened at the Crystal Palace today comprises the finest collection of machines and accessories ever exhibited in England. Society was absent, but if the attendance was disappointing the display of automobiles was magnificent. As regard superficial area, the show is larger in dimensions than the Paris exhibition. There is a good showing of American machines, of which four or five White steam cars came in for considerable attention because of their light weight and low prices. Altogether more than 200 firms exhibiting more than 600 machines are on the stands, while in the grounds 120 automobiles are running for the use of intending purchasers.

WINTER TESTS FOR CARS

New York, Feb. 1—Two of the new makes of machines exhibited at the recent show are to receive severe mid-winter tests.

Sidney B. Bowman will start this week with a LaFrance for a run to Washington and back. The new car will have as an escort the Peugeot owned by George R. Bidwell, managing director of the company. The party will be made up of mechanical engineers connected with the new company. The trip will take 4 days.

"Wally" Owen proposes to drive the new Moyea to the Chicago show and so submit it to as severe a test as 1,000 miles of snow, ice and mud can give it.

The Automobile Club of Pittsburg has been organized with 100 members. The officers are: President, George H. Flinn; first vice-president, J. F. Burke; second vice-president, W. C. Temple, third vice-president, D. H. Hostetter; secretary, Thomas R. Hartley; treasurer, Reuben Miller, Jr.

Charles Jarrott, the English automobile racing man, known best in connection with last season's performances of the Napier, is a close second to Barney Oldfield in challenging the winner of the Fournier-Winton match races.

CHOOSES A NEW PRESIDENT

Chicago Automobile Club Prompt in Accepting Alderman Honore Palmer's Recent Resignation

The specially called meeting of the Chicago Automobile Club last Thursday evening brought out a large number of members. As previously stated the meeting was for the purpose of accepting the resignation of President Palmer, who found it impossible to serve the interests of the club and at the same time keep his political fences in proper repair.

After stating the purpose of the meeting, and presenting the resignation of Mr. Palmer, a motion was made by J. E. Fry that it be accepted. A prompt second was forthcoming, and it was accepted without a dissenting vote.

C. W. GRAY ELECTED

The next business in order was the selection of a new presiding officer, and considerable friendly rivalry was exhibited. Charles W. Gray, the treasurer of The Inter Ocean Publishing Co., was placed in nomination. F. C. Donald was also named, as were Dr. F. C. Green and John Farson. Mr. Donald promptly declined to accept the office, stating his reasons, but in spite of his protest a number of the members insisted on voting for him. After the first ballot Dr. Green withdrew his name, and the second ballot gave Mr. Gray the office by a majority of one vote. Had it not been for Mr. Donald's declination it is probable that he would have received the unanimous support of the members present.

TO FIGHT NUMBERING

A warm discussion relative to the new 4-inch numbering ordinance then came up, and showed the determination of the members to defeat the measure if possible, and should it become a law to contest its enforcement in the courts. A committee of five was appointed to give the club's views on the matter to the judiciary committee of the city council.

President Gray called the directors of the club for Wednesday evening of this week, to perfect arrangements for the club's participation in the Chicago show, which opens Saturday, February 14. A reception and entertainment committee of twelve members is con-

templated. The president has also appointed a special committee to co-operate with the good roads committee of the N. A. A. M., which has in charge the mass meeting which will be held at the Auditorium on the evening of February 20. The members of this committee are P. H. Sercombe, chairman, and J. B. Burdette and H. H. Gross.

BEACH RACES ARE PLANNED

New York, Feb. 1—"Senator" Morgan, backed by the Automobile Magazine, has a great scheme and leaves for Florida tomorrow to see whether he cannot clinch matters with the hotels and railroads so as to insure its consummation. The senator has enlisted the cooperation of W. J. Stewart, chairman of the A. A. A. racing board, who starts on Wednesday to look over the ground and the possibilities of the project.

The idea, in a word, is a three days' speed tournament on the Florida east coast beach in the neighborhood of Daytona and Ormond, preceded by an automobile floral parade on March 9. It looks as though the hustling veteran would make a "go" of it. He has been in communication with the railroads and hotels for over a month and says the Daytona and Ormond bonifaces and the Seaboard Air Line and Southern Railway officials have given him every reason to believe that he can conclude the preliminaries on his present trip.

The 6 miles of beach between Daytona and Ormond, where most of the contests are to occur, presents an ideally smooth and hard surface for speeding, and stretches away for 30 miles in all on either side, giving an opportunity for longer races and trials.

MASSACHUSETTS LEGISLATION

No less than three bills have been introduced into the Massachusetts legislature. Two of them are reasonable, while the third is a most drastic one, attacking practically the rights of automobilists in the state. The latter proposed bill provides that all automobiles shall be registered, and that no automobile having a maximum speed greater than 20 miles an hour shall be registered. What that means can readily be understood by the automobilists. Furthermore, that the bill provides for the licensing of the operators and the reduction of the speed to 8 miles an hour in the city limits and 15 miles an hour in the country.

The Massachusetts Automobile Club and the New England Automobile Association have also introduced joint bills. These provide that the rate of speed shall be 20 miles an hour in the country and 12 miles an hour in the city limits. They require all machines to have suitable brakes, bell, horn or other signaling devices; numbers properly displayed, and that automobilists shall not be required to take out a license.

The bill proposed by the dealers' association is practically the same in relation to speed, but it goes further and provides that lights shall be carried in front and rear of the machines, that automobiles shall be registered but not licensed, and that they shall carry numbers.

IN THE NEW, EVER SUNNY SOUTH



MOTOR AGE

AUTOMOBILING ROAD AT SAVANNAH, GA.

MOTORING ON A FLORIDA BEACH

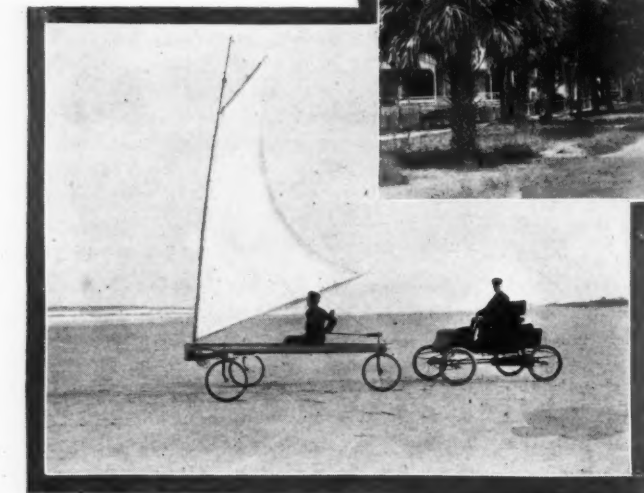
Rare Winter Sport in Florida—Northern Automobilists
Find the Sand Roadway an Ideal Course—Plenty of
Room, No Hills and No Restrictions

Daytona, Fla., Feb. 2—When the cold weather in the north interferes with automobiling there is a winter haven to be found at Daytona, Fla., where the enthusiast can run his machine nearly every day in the year. From December 12 to January 16 this winter there have been but three stormy days, and most of the time the noon temperature has ranged from 50 to 80.

PERENNIAL FLOWER GARDEN

Daytona, one of the beauty spots of the south, has a population of over 4,000 persons, composed largely of winter residents from all over the country. Its streets and avenues are laid out 100 feet wide, well graded and with many miles of smooth marled and shell roads. The town lies parallel with the Halifax river on its west bank and extends for 2 miles along the shore. It is situated in a forest of large live oaks covered with hanging moss that overhangs the streets and walks. Among them are many orange trees, palms and palmettoes, sweet bay trees, magnolias, holly trees, trumpet vines and wild grapes. The roses are always in bloom and the vegetable gardens look like those of midsummer in the north. Nature has indeed been lavish with her gifts here. It is a paradise for the wheelman and the automobilist. The roads are level and smooth and the bicycle is still popular here, both for business and pleasure.

Daytona beach is reached by three bridges that cross the Halifax river within a distance of 2 miles. The river is about half a mile wide and the beach is 1 mile from town over smooth streets and avenues. The South Bridge Co. has recently built a long bridge over the soft sand on the edge of the beach, so that an automobile or bicycle can be run onto the hard sand without difficulty.



MOTOR AGE

BY STEAM AND WIND POWER

The beach is probably the finest in the world and is a continuation of the famous Ormond beach. It extends along the coast for more than 30 miles in a straight line and it is from 400 to 600 feet wide at low water. The average rise of the tide is about 2 feet. There is always a good beach for riding several hours every day. The sand is nearly as hard as asphalt and very smooth. There are no stones. No road or street was ever built that is so smooth to ride upon as this beach.

Imagine a boulevard 500 feet wide, dead level for 30 miles, smooth as a floor. There is an automobile here that weighs 5,000 pounds, and it makes no impression on the hard sand of the beach. It is an ideal race course and a place where world's records will be made in the future. Is there another



A DAYTONA STREET

spot where one can sit still on a bicycle and coast for 30 miles at great speed by the force of the wind without touching the pedals? This condition does not exist every day, but only when we have a strong north or south wind.

The writer has a Stanley steam carriage which has a record on the Narragansett park track, Providence, R. I., of a mile in 1 minute, 31 seconds. He recently ran it a mile on the beach here in 1 minute, 14 2/5 seconds. The last mile was run before a wind blowing about 50 miles an hour, so there was practically no air resistance. Any motor bicycle or automobile is at least from 10 to 20 per cent faster here under certain conditions than at other places.

An engineer has been employed to survey a 5-mile course on the beach going southward from a point near the south bridge, and has erected sign posts at each half-mile and mile up to 5 miles. J. C. Pettepher, of Daytona, has an automobile station in a fire-proof building, with good facilities for taking care of machines and making ordinary repairs. The steamers from Boston and New York will bring a light runabout not exceeding 1,000 pounds in weight to Daytona for from \$20 to \$30. There are about a dozen automobiles here at present and more coming soon. In a few years this will surely be the winter mecca of the automobilist.

SAILS FOR POWER

There are other pleasures besides automobiling. The fishing has been good all winter. There are many pleasure boats and launches that make regular trips or can be chartered for private parties. The Halifax River Yacht Club has a commodious club house and nearly 100 members. Its fleet is composed very largely of launches.

There is also an automobile here that uses neither steam, gasoline nor electricity. It goes by wind and is capable of great speed when the wind is on its quarter. For sport it comes close to the ice boat of the north. The ice boat is probably faster in the same wind, but there is rare sport in running this novel automobile.—J. F. HATHAWAY.

Gougar & Todd, automobile dealers of Denver, Col., have purchased the building in which they are located and will build three stories on to it, the growth of the business necessitating more room.



SCENE ON DAYTONA BEACH

MOTOR AGE

THE READERS' ? CLEARING HOUSE

GASOLINE TANK AIR PRESSURE

Atlantic, Ia.—Editor MOTOR AGE—I have a Milwaukee runabout steamer. It does not steam fast enough. I usually run with about 35 pounds air pressure and the flames on the burner are only an inch or so high. Can you make any suggestions as to a remedy from my crude representation of the trouble? I want to congratulate you on the splendid improvement of MOTOR AGE.—W. C. EGAN.

Thirty-five pounds air pressure is not enough to generate the steam properly, as it does not supply enough gasoline to the burner. Not less than 50 pounds should be used for this purpose, and 60 pounds is even better.

VALVE STEM BREAKAGE

Kingston, Ont.—Editor MOTOR AGE—Can you suggest a remedy for the following trouble; I have a gasoline motor in which the valves are made in two parts, there being a wrought iron head with a 5-16-inch steel stem threaded and screwed into and riveted over on top of it. The stems are also threaded on their lower end for a nut and spring cap. The heads have broken off three new valves with less than 100 miles' use of the vehicle. The threads are the same at both ends of the stem, yet they invariably break next to the head.—H. L.

The breakage next to the head is easily accounted for, as the reseating of the valve each time it opens brings a solid blow or jar upon the stem from the spring action, while the blow received at the lower end next to the nut is an elastic one. The stems should be made at least $\frac{3}{4}$ of an inch in diameter next to the head and turned the rest of the length to 5-16 of an inch in diameter, this being done after the stem is screwed into the head and riveted.

VALVE DIAMETER

Minneapolis, Minn.—Editor MOTOR AGE—Will you kindly give me the size of the inlet and outlet valves on an automobile gasoline motor of the four-cycle type, the cylinder of which has a 5-inch bore and a 6-inch stroke? It is designed to be run at from 600 to 800 revolutions per minute with a compression of 60 pounds. Also, what should be the diameter and weight of the fly wheel for such a motor?—J. M. ORTON.

The inlet and exhaust valve openings should be $1\frac{1}{2}$ inches in diameter. The fly wheel diameter should be 20 inches, and the weight of the rim about 180 pounds.

NORMAL MOTOR SPEED

Reading, Pa.—Editor MOTOR AGE—I wish to enter protest against the manner in which show reports are compiled, particularly in reference to motor speeds. When automobiles used stationary engines they were provided with governors and this gave to the motor a "normal speed," but now that throttle control—used by us for more than half a dozen years—has become universally adopted, no such thing as "normal speed" exists, and the experts who prepare the reports should certainly not be guilty of perpetuating an indefi-

nite and worse than useless marking. Both manufacturers and buyers are interested in knowing the maximum power of which the motor is capable and in connection with this power, should be stated the speed at which this power is given. Those who delight in high speed are most interested in knowing the maximum speed of the motor, but an indefinite thing like "normal speed" should certainly be left out of consideration.

If the bore and stroke and the number of revolutions of the motor with relation to the driving axle, together with the size of wheels are given, the purchaser can figure for himself the normal speed that his motor will be driven at over his roads, and this is as close to the normal speed as can be obtained, and such information would mean something and be of value; but normal speed as ordinarily stated means nothing. Horsepower also is a very flexible term and if given should be accompanied by the bore and stroke of the cylinders and number of revolutions per minute at which the power stated has produced.—CHAS. E. DURYEA.

MOTOR AGE asks Mr. Duryea: In determining the speed ratio between the motor shaft and the driving wheels on the high speed gear or direct drive upon what number of revolutions of the motor shaft is the calculation based? Upon a flexible speed?

CAPITAL WANTED

Clinton, Ia.—Editor MOTOR AGE—I have just completed a gasoline automobile with two seats and a 10-horsepower double cylinder motor. It weighs but 750 pounds. It presents a good appearance and can be made to sell for \$600. I wish to interest someone with capital in the manufacture of this car.—J. A. CHAPMAN.

CLAIMS FIRST HONORS

Boston, Mass.—Editor MOTOR AGE—I have read the article, "A Daily Paper View," in

your issue of January 15, and desire to express my confirmation of its truly sensible comments. No man of the present generation is better able to pronounce this fact than the writer, who in 1877 was granted a patent for an improved traction wheel. He immediately built a vehicle and took it to a field in eastern Massachusetts, applied it to plowing and other branches of the agricultural industry, in all of which it worked successfully, hauling five plows at once, going from farm to farm by its own power and thus proving its liability to do the transportation of the world as well as the agricultural work—producing the means for doing successfully the two most important branches of work in our civilization. Let them laugh who will; the accomplishment is here and has been here for more than a quarter of a century waiting for an introduction. The automobile that is now in the hands of the people has grown from this event.—W. G. CLARK.

DISPOSITION OF PARTS

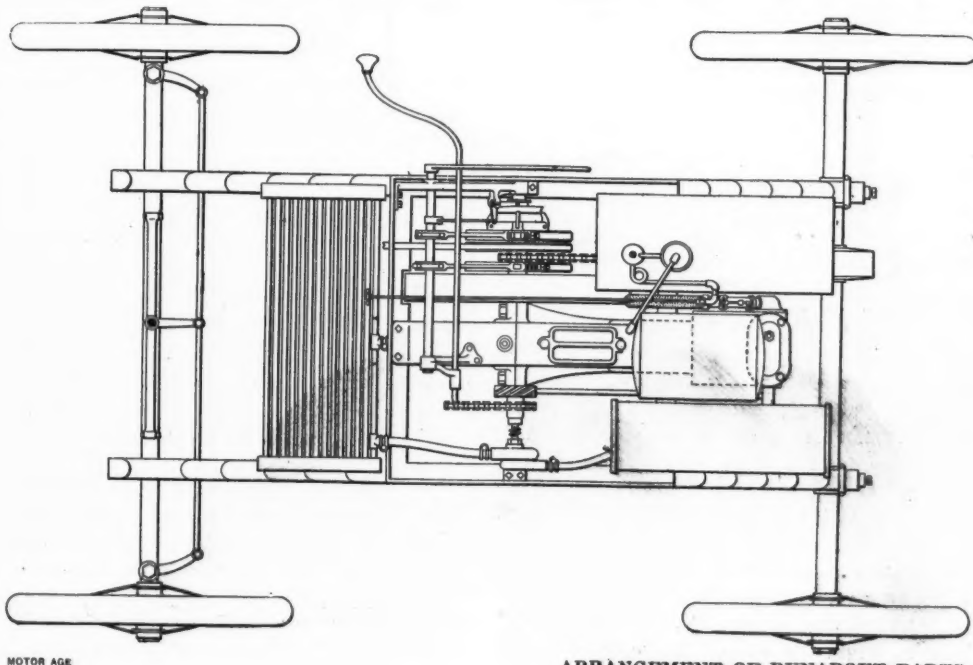
Reeseville, Wis.—Editor MOTOR AGE—Being a subscriber to MOTOR AGE, I take liberty of asking your advice concerning the following: I have an Olds pattern running gear. Will you publish a sketch showing how to mount the motor and accessories? I do not know how to hang my engine, which is a single cylinder horizontal motor.—REV. P. A. SCHMIDT.

A plan view of the running gear is herewith given, which shows the general arrangement of the motor, gasoline and water tanks, etc.

EXPERIENCE OF A DOCTOR

Milwaukee, Wis.—Editor MOTOR AGE—I wish to say a few words regarding my experience in automobiling. I have been a user of a 900-pound runabout for the past 2½ years—advertised as a 580-pound vehicle—and I would not for a moment think of going back to horses. If my machine were to be stolen I would say "All right, I have had the worth of it already." It is simply grand—the exhilaration of sailing over the ground like a swallow—but, and here is where I stop. The dirty, greasy thing; and one's hands and clothes. It is especially bad for a doctor.

I notice much said and written as to the



ARRANGEMENT OF RUNABOUT PARTS

vehicle for the doctors, and to the effect that what is good for them will be the proper thing for other people. Well, now, why doesn't some one build a rig fit for a doctor? Let me give my idea of what a doctor needs and wants, and will pay for, and a rig that will come into universal use and that quickly.

A double cylinder, upright gasoline motor in front under a hood, that can be started from the seat, so that the driver will not be obliged to go out into the mud and slush every time he makes a call. The crank—not the doctor but that of the engine—will project back into the body of the car, instead of forward. Six or 7 horsepower; a good roomy seat and a light but strong top; moderately heavy artillery wood wheels, 28 by 3-inch detachable tires; a cut-out on the muffler to wake up some of the sleepy old drivers and horses, on an up grade, in a head wind, and on a narrow road—you know what I mean, having all been there—a detachable tonneau for Sunday and the wife and children; everything so far as possible oil tight; few oil holes; good roller bearings all around; bevel gear transmission so there will be no bother with chains stretching and jumping off; three speeds forward and reverse; wheel steering, and some carrying space for a grip, fish rod, gun case, etc.—else why have an automobile?

Of all things a doctor wants in an automobile convenience and accessibility. When it rains he should be able to put up the top, draw up the front apron and fasten it, lean forward and start the engine, with everything dry and in order. He will then enjoy a ride as much or more in a storm, as when the roads are dry and the sun shines.

Here is what I have learned by experience: Get a good second-hand machine; you will spoil a new one anyway. I bought my second car three weeks after the first. Then remember three things—First, see that you have a good spark; second, that the gasoline is properly reaching the chamber; third, that the oil is reaching the piston rings. With these three things noted you will go and come to your entire satisfaction.—DR. J. L. WILLIAMSON.

AIR-COOLED MOTOR LIMIT

Jackson, Mich.—Editor MOTOR AGE—What is the largest practical dimensions that an air-cooled motor can have, with cast iron cylinder and cooling flanges cast on it, these being afterward turned and polished?—B. M.

Basing the answer on practical results, the limit of dimensions for such a type of air-cooled motor are 3½ inches bore and stroke. It might, however, be increased to 3½ inches bore and stroke if the valves are located in the cylinder head and the metal kept to the least possible thickness.

BALANCING MOTOR WEIGHT

Santa Clara, Cal.—Editor MOTOR AGE—I have a bicycle motor for which I wish to build a frame. If I place the motor in the center of the frame its width brings the rear belt pulley too far out from the rim. How can I balance the frame and set the motor to one side? The motor weighs about 50 pounds.—W. F. B.

If the motor is one of the encased fly wheel type commonly used, it will do no harm to put the motor to one side, or off the center. This is frequently done. If the fly wheel is outside the belt pulley can be placed inside

the fly wheel and the latter made to balance the cylinder.

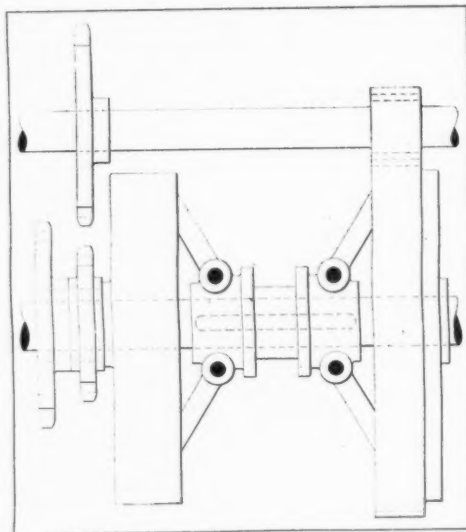
BRAKE HORSEPOWER

Joliet, Ill.—Editor MOTOR AGE—I am thinking of building a double-cylinder gasoline motor of 5-inch bore and 6-inch stroke. What horsepower should such a motor develop at 750 revolutions per minute? I do not mean rated or calculated horsepower, but actual brake horsepower at the driving shaft of the motor.—F. F.

If properly designed and constructed a motor of these dimensions should give at least 12 brake horsepower.

REVERSE GEAR DESIGN

Boston, Mass.—Editor MOTOR AGE—In regard to the transmission of which you desire a plan of the frame in order to ascertain the requirements before publishing a drawing, there is 14 inches of space on the shaft and the gear can be 10 inches in diameter. It is to go beneath the floor. I do not know of anything but a clutch and planetary



gearing that will answer the purpose and have seen no drawing of these, except some with several speeds and complications. I want as simple an arrangement as can be made and if I can see something that will suit me, should make it of cast steel. I shall gear down to four to one and my special transmission will again reduce it to six to one. The normal speed of the engine is 400 revolutions per minute. I have spent 4 years on the car and want to get it out this summer. It has cost so far \$500 for material and \$700 in labor, and will cost about \$500 more to finish. It will weigh about 1,500 pounds. I had a tonneau body planned one year before I ever saw or heard of one.—W. H. GRIFFITHS.

Within the space given it would be impossible to construct a planetary form of gear capable of transmitting 8-horse power at the speed given. A drawing is herewith given showing a construction with a pair friction clutches on the shaft and a back gear for reverse, and with a sprocket and pinion drive to the spur gear on the reverse friction clutch periphery.

If there is no impediment or obstruction in front of the transmission shaft, such a transmission as shown would seem to be suitable and far more simple than a planetary gear.

HORIZONTAL AIR-COOLED MOTOR

Cleveland, O.—Editor MOTOR AGE—Referring to your recent editorial suggesting a more ac-

tive development and application of the air-cooled motor to automobiles. I ask if it would be consistent with your policy to favor me with a criticism of a design of that type of motor on which I have been working? To work out the ideas with an actual model would perhaps prove its practicability—or the reverse—but your opinion will doubtless save me much time and money, which I cannot afford to spend until reasonably convinced concerning certain features. I have all confidence in MOTOR AGE and consider it a sort of auto-cyclopedia, my file of many colored copies dating back to the time when they were mere pamphlets. To facilitate your criticism I submit a diagram of the motor.

The end in view is to build a light runabout, to be sold at popular price. The motor is to be of the double opposed cylinder, air-cooled type located in the hood in front with the crank shaft at right angles to the carriage axle. The bore of cylinders will be 4 inches and the stroke 4 inches. The hood will be so designed as to concentrate the draft on the cylinders when the vehicle is in motion; and fan-blades are to be secured to rim of the fly wheel to force a draft against the back cylinder. Separate disks are tightly fitted over the cylinders instead of casting small fins on the cylinders. These disks are made thin and with a diameter sufficient to give ample radiating surface.

As the valves in air-cooled motors are quickly impaired through crystallization and other causes, I have designed this motor to minimize that trouble by having but one valve opening into the combustion chamber. This valve is held open during two cycles and is seated during two cycles. The cold mixture is drawn through this port and over the valve immediately after each exhaust, thus keeping down the temperature of the valve and assisting carburation of the explosive mixture. With but one valve a slightly higher compression of the charge might be a possible result. As the action of the vacuum would not affect the valve, a light spring only would be required.

Two additional valves of light construction are necessary, these to act somewhat in the nature of check-valves. I have shown these to be gravity seated and made with quite large diameters to minimize the lift as well as the pound and noise. A copper ring or washer also protects the main valve to some extent. The dead space between the valves is made as small as possible.

The sparking points are encased in a plug which screws into the opening necessary to grind the valve seat and insert the valve. The cavity in this plug will retain burned gas during the exhaust and induction strokes but a slight compression makes the spark effective. The spark-plug in this way will perhaps be kept free of carbon and other deposits.

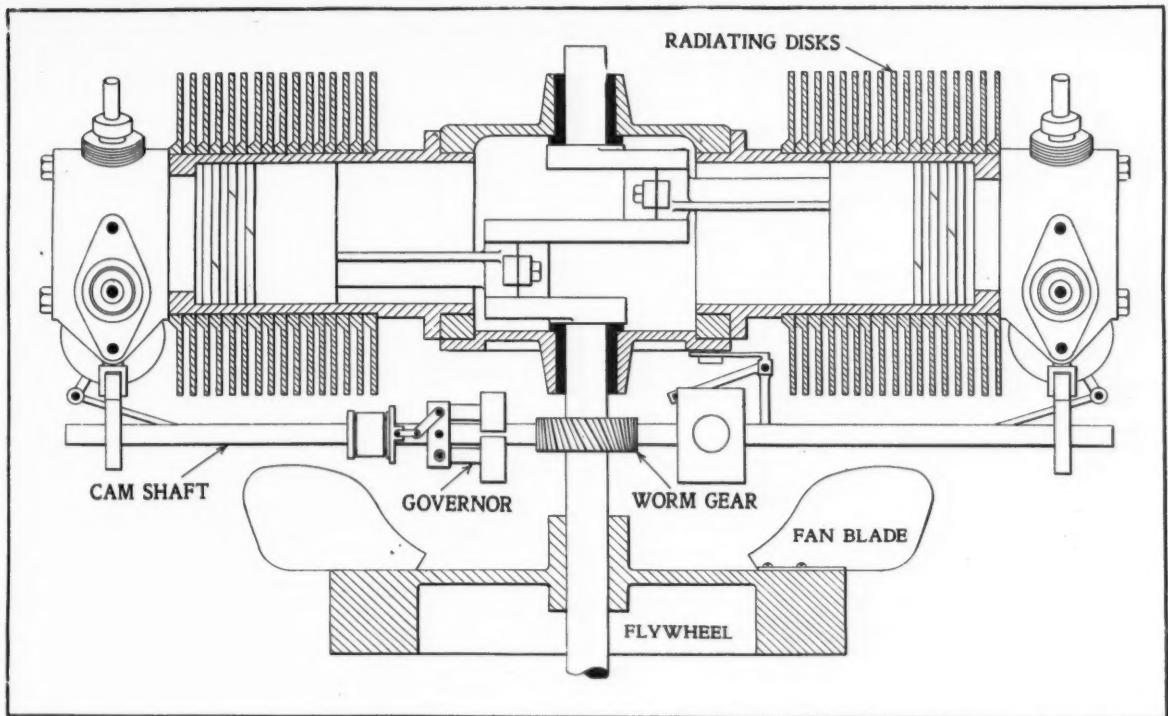
The carbureter is of the "positive-feed" variety. A similar design with float-feed and constant level I have used quite satisfactorily on large engines and I believe that mixing-valves are not suitable to variable speed motors. I have added a device to this design to admit additional air, the quantity to be regulated by the speed of the engine. The mixing chamber contains three sections which can be readily removed. The upper section, which is of brass tubing, is used as a throttle, a hole in the tubing registering with the port leading to the motor. The throttle is controlled by a lever on top of the carbureter and is manually operated. The second section is composed

of several diaphragms of wire gauze to atomize the gasoline and also act as a fire check. The lower section of tubing is another throttle or auxiliary air regulator. Small holes in the tubing register with similar holes in the wall of the chamber. This section is moved as the speed of the motor increases and admits sufficient free-air to keep the mixture at approximately proper proportions. This throttle is operated and controlled entirely by a governor on cam-shaft. The same governor also controls the commutator and keeps the time of ignition at the most effective point.

The cylinders are in alignment, therefore one cam-shaft operates both cams. The cams and valve-stems, with the rollers, will be encased, as will be the worm-gear which operates the cam-shaft.

Will it be practical to use radiating disks in the manner described? If so, could not an aluminum alloy be used instead of cast iron to obtain greater radiation? Would the difference in expansion of the metals make any material difference? Would the arrangement of the valves in the head be practicable? The exhaust check valve would certainly receive a great amount of heat, but would it be excessive? A small pipe from top of crank-case, with ball-check, might force a draft of cold air against the top of this valve twice for each exhaust, the whistling noise would go through muffler. Would this be too complicated? Would fan blades on the fly wheel be permissible?—M. J. ROSEBORO.

The separate disks shown on the cylinders for radiating purposes would be far more effective if made of sheet aluminum or copper. After the ribs reach about one-half the cylinder diameter in width, they lose their radiating effect greatly, and are really only added weight for no purpose. Ribs cast on to the cylinders, about $\frac{3}{4}$ to 1 inch deep, and after-



ROSEBORO'S AIR-COOLLED MOTOR DESIGN

wards turned and polished give better results than separate disks.

The valve combination shown is not new, and has also been the subject of numerous patents. It is hardly practical and is far more complicated than the type most generally used—that is, two separate valves, the exhaust valve being mechanically operated and the inlet valve atmospherically operated. Furthermore, too much metal is involved in such a construction, which from an air-cooling standpoint is bad policy, as the body of metal used should be as thin and as small in bulk as possible. The stem of the mechanically operated valve shown would have a pin through a slot in the stem guide, to prevent the roller from getting out of alignment with the cam. This would prevent the valve from being free to move around on its seat.

With the fan located on the fly wheel, the speed would not be sufficient to give much air circulation as 900 revolutions per minute is about the practical working limit for a 4 by 4-inch motor of this type. The fan speed should be at least 1,500 revolutions per minute. Such a fan as that shown attached to the rim of the fly wheel would be inefficient in any case on account of its location.

The largest air-cooled motors now made, with one exception, have 3½-inches bore and stroke, and larger sizes do not seem to be a success, with the exceptional case mentioned, and which has a style of radiation peculiar to itself. Simplicity should be the aim of the builder of a popular priced motor; with the design shown the cost of construction would be almost as much as for a motor for an expensive automobile. A single carburetor is all that would be necessary, and better regulation would be insured by this means.

COIL CONNECTIONS

Decatur, Ill.—Editor MOTOR AGE—I have an induction coil of French make, with only three binding posts or terminals on it, these being marked B, M and P. Can you inform me what these marks mean, and how the coil should be connected to the battery and spark plug?—B. S.

The terminal marked B, means, in French,

"bougie," and should be connected to the spark plug; the terminal marked M, or "masse," should be grounded on the motor, and the other terminal, marked P, or "pile," should be connected to one of the battery terminals. The rest of the connections should go to the contact maker and switch as usual.

FIRING IN MUFFLER

Lockport, Ill.—Editor MOTOR AGE—What is the cause of explosions occurring in the muffler of a gasoline motor?—E. B.

The explosions in the muffler are due to some of the charges in the cylinder not firing. These are forced out through the exhaust valve into the muffler. After a charge has missed fire the next charge is consequently richer and after ignition and expansion is still burning, so that when the exhaust valve opens it fires the unburned mixture left in the muffler from the previous charge.

TESTING SMALL BATTERY

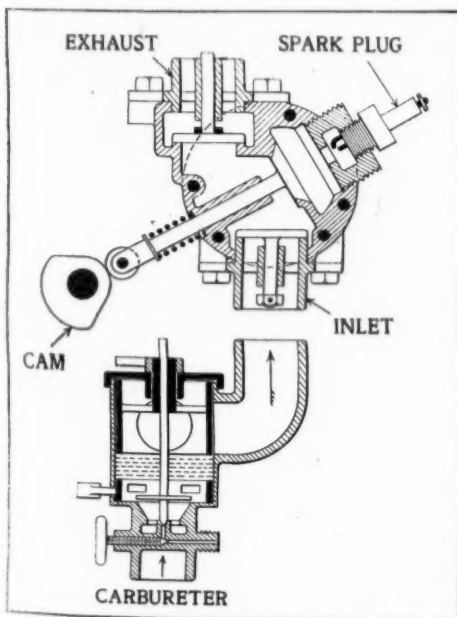
Louisville, Ky.—Editor MOTOR AGE—What is the best method of testing a small storage battery of two cells to find out if it is fully charged?—H. F.

Get a 4-volt, 1-ampere incandescent lamp, and after cutting the battery out of the charging current, put the lamp in circuit with the battery for a few seconds only. If the battery is fully charged the lamp will give out a brilliant light. On no account use a pocket ammeter to test a storage battery; it will injure the battery if kept in the circuit long enough to get an accurate reading.

SLIDING GEAR TEETH

Akron, Ohio.—Editor MOTOR AGE—I am building a sliding gear form of speed transmission to transmit 8 horsepower at 850 revolutions per minute. What should be the proper size of the gear teeth and their width of face, and what are the best materials to use in them?—T. P.

The gears should be of No. 6 diametral pitch and not less than of 1½-inch face. The pinions should be of steel and the gears of phosphor bronze.



Roseboro's Carburetor and Valve

FORM OF CATALYTIC IGNITION

Method by Which the Induction Coil, Fouled Spark Plug Points and Mechanical Spark Timing Mechanisms are Obviated — Has Simplicity of Hot Tube Ignition Without Consumption of Gasoline

Experiments are being made in France with a new adaptation of catalytic electric ignition. The system comprises an ignition plug in which a small platinum wire is maintained in an incandescent condition, the degree of heat of which may be changed to regulate the speed of the motor.

TWO-PART PLUG

The plug comprises a metal tube, into which screws a body part, to which one end of the platinum wire is attached. The other end is attached to a central stem which passes through the body part and is insulated from it. The wire is spirally disposed between the two and occupies the chamber or compartment formed by the union of the outside tube and the body of the plug. This compartment communicates with the motor cylinder by means of an open passage.

The electrical circuit is simple. The wire from the central stem of the plug is connected to one pole of a specially made rheostat. The other pole of the rheostat is connected to one pole of a small storage battery. As the body of the plug is of metal and is screwed into the motor cylinder head, the other pole of the battery is grounded onto the motor at any convenient point.

THE RHEOSTAT

The rheostat comprises an open wound coil with an adjustable contact, with which the degree of resistance and consequently the temperature of the incandescent platinum wire in the plug may be varied. Hence, by movement of this contact the normal degree of heat of the platinum wire for any motor may be fixed so that the ignition of the charge will always occur when the compression of the charge reaches a certain point. The contact on the rheostat can be used for speed regulation while riding, as by adjusting it so as to raise or lower the temperature of the platinum wire in the plug the point in the compression of the charge at which ignition will occur is accordingly varied.

AUTOMATIC REGULATION

It is claimed further that this system of ignition forms a sort of automatic ignition timer or governor, this action being based on the assumption that the temperature of the charge is greater the more rapidly it is compressed on account of increased speed of the motor. Thus, when running rapidly under a light load the compression is fast naturally and the ignition is advanced, while when running up hill or under other conditions which retard the machine the motor is slowed and the compression by being accomplished more slowly does not heat the charge to the same degree and hence causes a late ignition and a continued slow running until the natural conditions are altered.

ITS ADVANTAGES

This form of ignition is substantially the same in effect as the old hot tube system, but has the advantage of not consuming gasoline in addition to that used by the motor itself. It is simpler than the ordinary form of electric jump spark ignition in that no induction coil or contact maker or, in fact, any mechan-

ical device is necessary. A single or double cell storage battery, a resistance coil and the catalytic plug comprise the outfit. It is no mean advantage that the high tension current and its consequent insulation troubles are obviated.

The consumption of electric energy with this type of ignition is of course far greater than with the primary make and break or the jump-spark form of ignition. But the obviation of mechanical devices, induction coils and a multiplicity of wiring, and the reduced first cost, are offsets to this point. Further an inexperienced person can use it, or repair it without difficulty.

THE MERCEDES FOR 1903

Principal Changes in This World Famed Car—Speeds and Grade Climbing Ability Afforded

Much disappointment was caused at the Paris automobile show by the exhibition only of 1902 patterns of the famous Mercedes car. Since then much comment has arisen and much conjecture has been made as to the probable character of the 1903 pattern, which will make its debut during the automobile events of the "Week of Nice" in March. MOTOR AGE has secured the following points concerning the principal changes that are being made in the 60-horse power pattern:

The main frame has been reduced considerably in weight, now weighing only 77 pounds. The rear axle instead of being made of steel tubing is of I section rolled steel. The entire weight of the frame, springs and axles has been reduced to 220 pounds. The well known honey-comb radiator is retained, but in modified form, presenting a greater radiating or cooling surface. The revolving fan which has hitherto been used behind the radiator to produce a forced draft has been dropped as unnecessary, the theory being that the air current established by the fan is in effect only at the outer or rim portion of the radiator and that such a current is maintained by the fly-wheel. In the speed change gear the only noticeable difference is the adoption of di-

rect drive for the highest speed. A new ignition system has been adopted the principles of which have not been made public except to the extent that the ordinary spark plug is replaced by a plug with a continuous wire. It is possible from this that the newly devised method of catalytic ignition has been adopted by the makers of the Mercedes. The four cylinder motor is of 6.69-inch bore by 5.51-inch stroke, with a speed of from 1,000 to 1,200 revolutions per minute. The weight of the complete car is 1980 pounds.

The following tables give the calculated speed and hill climbing qualities of the 18 and 60-horse power patterns, the only two models that will be made this year:

18-HORSEPOWER PATTERN

Teeth on Front Sprocket	16	18	20	22
Speeds	Miles per hour	Per cent grade	Miles per hour	Per cent grade
1st ...	8 1/2	22	9 1/2	20
2nd ...	17	9.2	19 1/2	7.9
3rd ...	27 1/2	4	30 1/2	2.8
4th ...	34 1/2	1.8	38 1/2	1.1

60-HORSEPOWER PATTERN

Teeth on Front Sprocket	28	30	32	34
Speeds	Miles per hour	Per cent grade	Miles per hour	Per cent grade
1st ...	16 1/2	33	17 1/2	30.5
2nd ...	35	12.6	37 1/2	11.3
3rd ...	51 1/2	5.6	55 1/2	4.6
4th ...	64 1/2	1.3	71	0.4

NUMEROUS POINTS TO STUDY

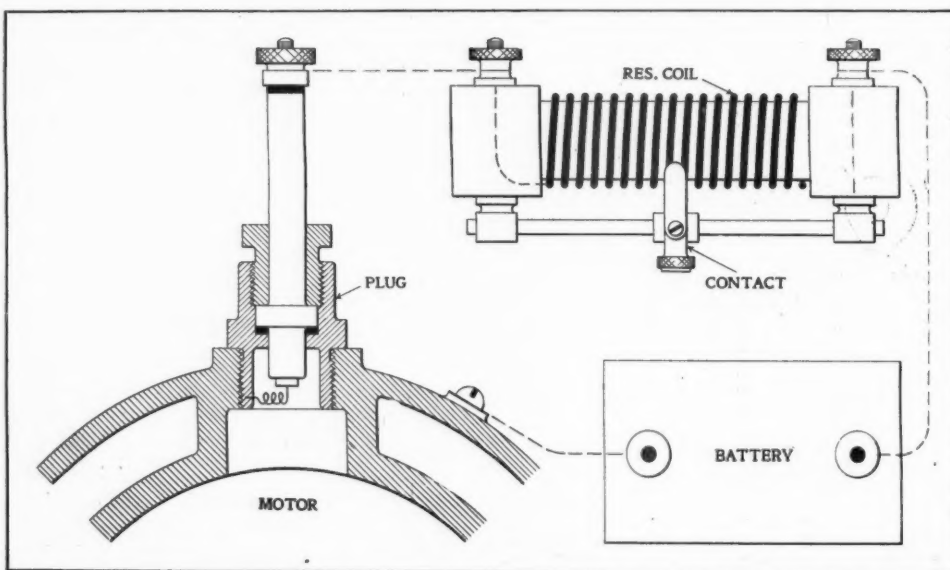
Design and Construction of Motor Bicycles
Present Great Opportunities for Experiment

An English motor cycle expert, G. R. Mercer, at the January meeting of the Liverpool Cycle Trades Association, presented the following points in motor bicycle construction demanding further study and experiment:

The best design of frame, and the proper strength of all its component parts.

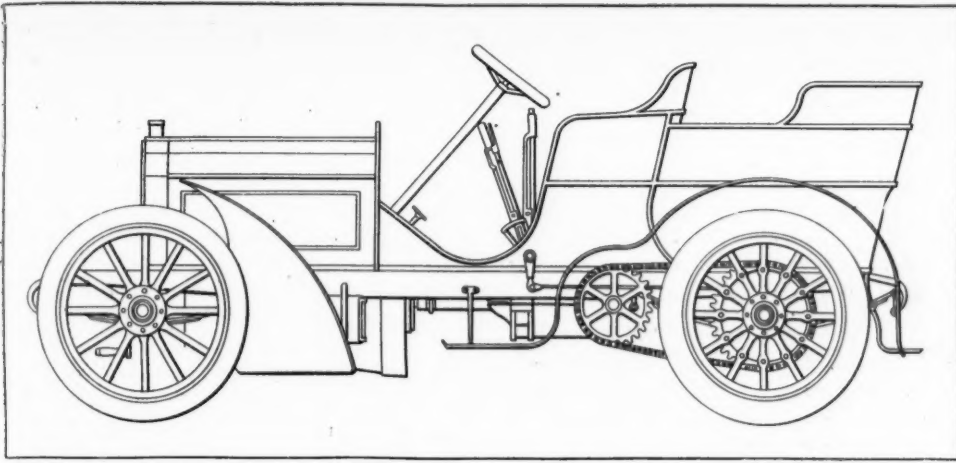
The proper position of the engine; keeping in view stability, balance for perfect steering, and elimination of vibration at the handles, saddle and pedals; also the consideration of the ultimate influence of the rapid and persistent engine vibration on the framework.

The best metal for cylinder and head castings.



MOTOR AGE

CATALYTIC IGNITION SYSTEM



MOTOR AGE

THE 1903 MERCEDES

The arrangement of all parts so as to be easily accessible for repairs and adjustment.

The proper weight and diameter for fly wheels, and the correct balancing of the reciprocating parts.

The best tires to stand their work and prevent any tendency to slip on greasy roads.

The most useful power of engine for general all around road use; which means plenty of hill climbing power, and not too great a speed on the level. Catering to racing men and those who like engines of excessive weight and power might safely be left to makers who imagine there is profit in that class of business.

The desirability, or otherwise, of complicating the machine with variable speed gears and water cooling.

The best system of ignition, having in view the elimination of sparking troubles.

Automatic lubrication of the engine.

The best system of silencing exhaust.

The best system of transmission. This at present seems to be divided between rigid chains with slipping catches and slightly elastic belts which drive smoothly and slip naturally.

The most efficient and economical mechanical carburetor which would require the minimum of attention. The surface type, it might be assumed, would soon become obsolete.

The best methods of actuating and governing the inlet and exhaust valves.

The best practice in driving or controlling the engine, either by throttling the exhaust or inlet, or both.

Position and number of levers, and the advisability, or otherwise, of coupling or combining into single lever control.

The speaker said it would also repay makers to study well the practice adopted on stationary gas engines. In considering the points specified, the maker should never lose sight of the fact that in nine cases out of ten the machines would go into the hands of novices, and, therefore, simplicity and reliability must be the keynote of his work.

Apart from the points mentioned for the study of manufacturers, it was advanced that there are many matters which must be considered by the agent. He must buy and sell carefully, ride a machine himself, lend it freely to likely buyers, closely study the engine, study well the papers which deal with motor bicycles, and keep thoroughly in touch with the movement. An agent should give careful practical study to the following points:

Thoroughly master the action of the engine and all its parts, and understand why a motor goes, and under what conditions it will not go.

Thoroughly master the ignition system, giv-

ing special attention to the action of the coil. Buy a voltmeter to test accumulators, and also learn how to tell their condition from the appearance of the plates. If the agent has electric light on his premises, he should learn how to charge accumulators from it.

Learn how to adjust tremblers or wipe contacts, also trembling coils. To attain that knowledge, disarrange a motor bicycle and re-adjust it.

Learn how to set the timing gear correctly.

Learn how to trace and remedy loss of compression in the engine.

Buy a densimeter, and understand the testing of the quality of gasoline.

Understand how to grind in the valves, also how to fit a new piston ring.

Learn how to treat a bearing or piston which has tightened.

THE ELLIPSE IN STEERING

One of the most difficult problems in automobile design to solve with theoretical accuracy, even though solution to the extent of attaining practical efficiency is comparatively easy, is that of projecting the steering connections in such manner that the front wheels will in turning both great and small angles act without slippage. It is assumed by all that non-slippage depends upon a projection of wheel axes in which the lines from all four wheels will intersect at a common point regardless of the angle at which the vehicle is turned. To secure this result many methods

of procedure have been adopted, from that of determining the steering pivot arm angles required by the experimental method to elaborate systems of mathematical geometrical projection.

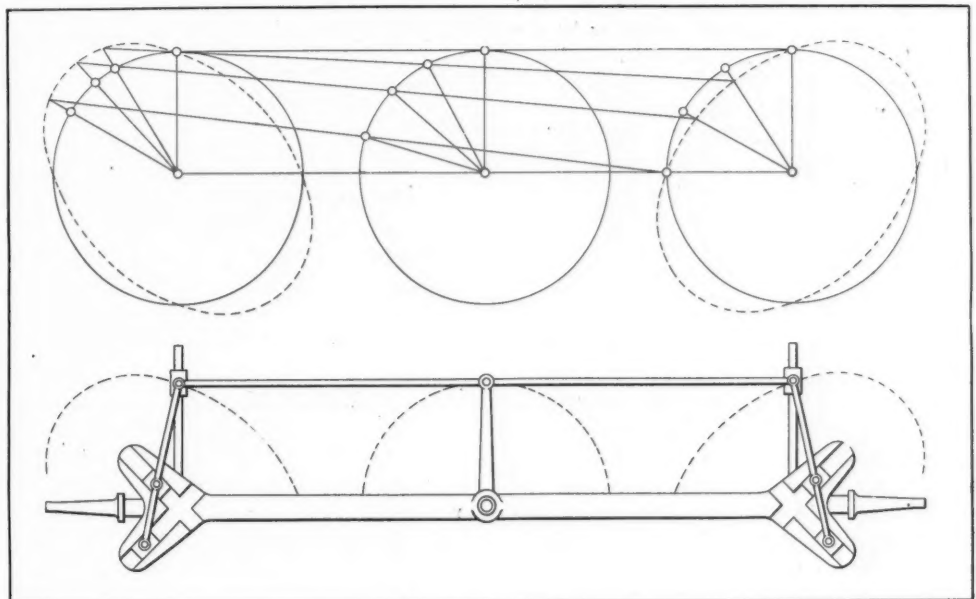
A patent recently issued to H. J. Elsner, of Balk, Germany, presents a method of attaining approximately theoretical accuracy in steering by a simple process of adapting an elliptical instead of the usual circular path of movement of the connection between the steering pivot arm and the actuating link.

The points of connection of the transverse steering bar with the steering pivot lever arms are arranged movably. The steering bar is actuated by a vertical shaft on the stationary axle, from which a link or lever arm extends to the normal center of the steering bar. If the steering bar is placed for each of the several positions indicated in the diagrammatical view, each of which positions of the steering pivot lever arm is assumed to be correct for theoretically accurate steering, it appears that the points of contact of the steering bar on the pivot lever arms each describes a curve which closely approximates a true ellipse, the center of which is the center of rotation of the steering pivot lever arms.

Neither of the two main axes of the ellipse coincides with the front axle, but each inclines from the axle at about 45 degrees. The eccentricity of the curve is too great to be replaced by a circle but small enough to allow the use of an elliptic steering apparatus such as the double slide device illustrated. In this form of construction the points of contact of the connection of the steering bar with the steering pivot lever arms describe ellipses, while the operative center of the bar describes a circle. An elliptical path might be substituted for the slides to guide the point of connection of the bar with the lever arm, but the three point guide illustrated is preferred by the patentee of the system as better compensating any twisting tendencies to which the steering apparatus might be subjected in practice.

MOVED TO CHICAGO

The Automatic Lubricator Co. has moved its headquarters from Toledo, O., to its Chicago office in the Caxton building, 334 Dearborn street. It has added several new styles of automatic oilers to its 1903 line and is prepared to make prompt shipments of all orders.



MOTOR AGE

ELLIPTICAL STEERING MOVEMENT

TO HAVE MANY NEW STORES

Boston Dealers are Erecting Large, Well Equipped Garages—This Season's Trade Expected to be Lively

Boston, Mass., Feb. 1—Some radical changes are being made or contemplated by the members of the local automobile trade. Perhaps the greatest single undertaking is that of the Winton company, which is having a special building constructed for its own occupancy. Harry Fosdick, the Boston manager of that firm, has long been handicapped by inadequate showing and storing facilities. Failing to find just what was desired in that line, he has taken the bull by the horns, the result being that he is now awaiting the completion of his new building at the corner of Berkeley and Stanhope streets, right in the automobile section of the city. This building is to contain a large show room, as well as an up-to-date repair department, and suitable facilities for the storing of customers' cars. The building will be ready for dedication before the end of the month.

The Locomobile company, represented by Mr. McAlman, who has long been in charge of the Boston branch, has recently secured new quarters on Berkeley street, near Tremont street. The new establishment has two large show windows in which the largest of the cars of this company can be shown, while the floor space is all that can be desired. Another thing is the increased facilities for repairing and storing carriages. The establishment is a great improvement over the old quarters, and Mr. McAlman is much pleased with the change.

WHITE QUARTERS EXTENDED.

George H. Lowe, representing the White Sewing Machine Co., is also about to make a much needed change. He has secured a lease of the store adjoining his present salesroom, and which runs from Tremont street to Warren street. The party wall will be demolished making the two stores into one large and commodious salesroom. Storing and repairing facilities have also been added, and these three establishments, each in itself, make an up-to-date automobile garage.

Dudley Marks, who has been at the White factory in Cleveland for several months, has returned to Boston, and will hereafter be the right hand man of Mr. Lowe. Mr. Marks is recognized as one of the most capable chauffeurs and mechanics in this city.

The International Motor Co. will handle the Cadillac in Boston this season. Manager W. A. Eldridge is daily expecting the arrival of the new models, and will then strike out in an energetic manner for new business.

SHATTUCK RUNS THREE STORES

F. E. Randall has severed his connection with the Peerless company, having secured the Boston agency for the Stevens-Duryea. The interests of the Peerless company in this city will after March 1 be looked after by Mr. Morrison from the home office. He expects to open a branch here about that time.

H. B. Shattuck & Sons keep no less than three stores going—their salesroom on Columbus avenue, repair shop on Stanhope street, and the garage in the old Battle of Gettysburg building on Tremont street. F.

C. Graves, an old cycle racing man, has joined the Shattuck forces, and can now talk automobile as well as he once could ride a bicycle.

Reed and Underhill, Boston representatives of the Stearns and other carriages, are about to make a change in their location. They have leased the quarters now occupied by the Winton people and as soon as the latter take possession of their new quarters Reed and Underhill will also move.

VETERAN DEALER DEAD

The sudden death of P. C. Lewis has proved a shock to the local trade. Mr. Lewis was the pioneer automobile agent in Boston, and had constructed for his use a large building on Stanhope street, which had become known as Automobile Headquarters. At the opening of this building Mr. Lewis held an automobile show, the first one in Boston. His death removes a valued member of the trade. His son, Percy Lewis, will continue the business.

CHICAGO TRADE VIGOROUS

Early Buyers Seeking Early Deliveries—Two New Stores on Michigan Avenue Opened

Chicago, Feb. 3—A visit to the different automobile establishments of the city during the week shows that sales are unexpectedly large for this time of the year, and that many buyers are placing their orders prior to the opening of the show, as they fear if they wait until that time deliveries will be delayed. In most cases orders are made from catalogues, as many of this year's models have not yet been received. All along the line the best of feeling prevails, and predictions are for a largely increased business this year over last. The first of May will see a number of changes in the quarters of some of the agents, an earlier move being impossible because of existing leases.

The Ralph Temple & Austrian Co. has moved into the new store at 1408 Michigan avenue, and has installed a line of handsome carriages, including the new Toledo touring car, the Yale, the Long Distance and the Franklin. The new store has been handsomely decorated.

The newly erected store of the Cadillac Automobile Co. of Illinois has just been completed and is now ready for its stock of Cadillac and Stearns gasoline cars and National electric.

Manager Jones, of the Electric Vehicle Co.'s Chicago store, is anxiously awaiting the new gasoline touring car, which he expects to receive the latter part of the week.

The Friedman Automobile Co. will this year market its machines direct in Chicago, new quarters having been engaged on Michigan avenue near Thirteenth street.

Carl Metzger, a cousin of W. E. Metzger, of Detroit, with whom he has been associated in business for some time, has accepted a position with the Ralph Temple & Austrian Co.

NEW INDIANA MAKER

S. W. Zent, formerly an automobile builder at Marion, O., has become allied with the Single Center Buggy Co., of Evansville, Ind., for the purpose of manufacturing a 9-horsepower single cylinder gasoline car. A new adaptation of the planetary gear system of transmission is to be one of the characteristic features of the machine, which will be sold at a moderate price.

MORE ROOM IN THE GARDEN

Madison Square Garden Co. Laughs At Hint That the Building Is Not Large Enough For Automobile Shows

Secretary Young, of the Madison Square Garden Co., of New York, smiled when a MOTOR AGE man told him Saturday of the discussions and suggestions afloat in reference to the solution of the problem of housing the next automobile show.

"They forget," said he, "that in the days of the bicycle shows Madison Square Garden found room for three times as many exhibitors as were at the recent motor vehicle function. I don't think we will have any trouble in accommodating all that apply and giving each a reasonable amount of space. Those who are worrying over the matter seem to forget that we have two galleries and that with their seats removed a great area is secured.

AISLE IN BALCONY

"Next year's problem is not difficult enough to set us to figuring yet," he continued. "All we have to do is to take out the front gallery seats. We can then have an aisle with booths on either side, light vehicles being set in front facing the arena below. The view will thus not be obstructed and the artistic tout ensemble will not be marred. The main floor, restaurant, basement and double-spaced gallery will surely accommodate all the complete vehicles. We will then have the second gallery for the sundries and parts people, with the assembly hall for an overflow in case of emergency. This doubling of the first gallery and the addition of the second will add eighty spaces."

METROPOLITAN TRADE NOTES

J. C. Brandes, American agent of the Cudell automobiles, German machines, which have attracted much attention since their importation, began shortly before the show, is to remodel his garage in Thirty-first street, New York, so that it will be one of the handsomest in the city.

The opinion is growing that one week is too short a limit to a national show. Madison Square Garden exhibitors complain that they were rushed to death during the week and that the show ended with far fewer sales and agencies closed than would have been the case had they actually had enough time to attend to the business offered or in sight.

The General Electric Co., it is said, will shortly begin the manufacture of gasoline vehicles at Lynn, Mass., where experiments have been conducted with a machine of this type, whose patents the company controls.

The American Steam Wagon Co. is about to begin the manufacture of vans, trucks and busses, and will employ the system used in the construction of the Adams Express Co.'s wagon, though the discarding of the smoke stack in front will be one of the improvements.

DURYEAS IN IOWA

The Waterloo Motor Works, of Waterloo, Ia., has recently been incorporated with a capital stock of \$200,000, of which \$150,000 is paid in in cash. This organization combines the gasoline engine businesses of the Waterloo Gas Engine Co. and the Davis gasoline engine department of the Cascaden Mfg. Co., both prominent concerns of Waterloo, Ia., having successful business records of eight

to ten years. The new concern will not only continue the manufacture of gasoline engines, but will at once taken up the manufacture of Duryea motor vehicles on a large scale and attempt to supply the rapidly increasing demand for this long recognized carriage. A new factory is being constructed and a complete and modern equipment will be provided for the rapidly growing motor vehicle business. This does not, however, interfere with the production of Duryea carriages by the Duryea Power Co., of Reading, Pa.

LOCAL SHOW COMPETITION

Boston Dealers and New England Clubmen's Organization Clash Over Exhibitions

Boston, Mass., Feb. 1—Over a month ago the Boston Automobile Dealers' Association announced that it would hold an automobile show in Symphony Hall the week commencing March 16. The committee went to work, with the result that it secured the entry of all local dealers save three, and they would not exhibit on account of the N. A. A. M. agreement. On Saturday the New England Automobile Association was formed and the first thing it did was to announce the holding of a show in Mechanics building the week commencing February 24. This association is headed by the president of the Massachusetts Automobile Club, and there are many who are not backward in saying that the show announced by it is a game of spite, because the dealers association did not join hands with the automobile club in its legislative matters.

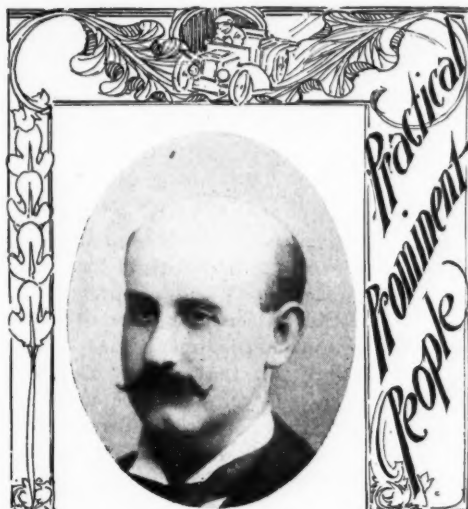
There is a long story to both sides, mainly interesting to local people. The fact remains, however, that both shows are announced, and both parties claim that they will be held. The N. E. A. A., of course, scored on the dealers' association by dating its show the earlier, thereby gaining the advantage of the press work already done by the dealers, and that has been considerable.

So far as can be learned only one of the local dealers has promised to exhibit at the Mechanics' building, and that dealer has also paid for space in the Symphony Hall show.

If the N. E. A. A. carries on the plans as proposed, it is apt to run up against other trouble in other cities, as it says it will hold a series of automobile race meets in the leading cities of New England. Only one city in New England held a race meet last year, and that was Providence. Should the new association go to that city to hold a race meet there will be "something doing," as the president of the Rhode Island Club is also president of the American Automobile Association, and it is not reasonable to believe that Dr. Chase will grant a sanction for a race meet to any other than his own club, especially as it has for the past three years held race meets in Providence.

BONDS FOR GOOD ROADS

The good roads crusaders seem to have the upper hand in the New York state legislature. Lieut. Gov. Higgins, Speaker Nixon and Assemblyman Allds are resolved to place a sine qua non "rider" on the canal bill providing for the issuance of \$50,000,000 of good roads bonds. The counties desiring to build roads may take any proportion of these bonds that may be required by paying merely 3 per cent interest and 2 per cent into the sinking fund.



J. H. NEUSTADT

There are specialists in every field. One of the first men to realize the necessity of them in the automobile business was J. H. Neustadt, of St. Louis, who, by his persistent endeavor, has become an important factor in the industry. Mr. Neustadt organized the business in which he is engaged, about three years ago, and about twelve months ago incorporated it under the present title of Neustadt-Perry Co. He has made less effort than some others to impress his personality on the trade, but has built up a business which extends to all parts of the United States, while export houses have carried the fame of his goods to many foreign lands.

CUSHION FRAME TESTED

New York, Feb. 1—Henry Fournier took a test trip yesterday in an automobile fitted with a cushion device to secure easy riding and freedom from vibration. The device, which is the invention of C. L. Hovack, of this city, has already been described in *MOTOR AGE*. Briefly it consists of small springs regulated by an air and oil cushion placed horizontally

between the running gear and body of the vehicle, the flow of oil being so regulated as to retard the backward action of the springs and so neutralize the shocks to the machine.

M. Fournier was highly pleased with the device and declared that it gave better results than the vertical air cushions now being fitted to some of the Mors and Mercedes models of this year, whose recoil he said was much more pronounced than the one he tested yesterday on rough West Side streets.

NEW CATALOGUES RECEIVED

Well Compiled Booklets Show Both Typographical and Literary Excellence

From Bruhl Bros., of Yokohama, Japan, who operate several automobile and cycle stores in the Orient, comes a booklet replete with illustrations of American gasoline, steam and electric automobiles. The firm has shown all of the best known makes and has distributed several thousand of the booklets throughout Japan, China, the Straights settlements and the Orient generally. New editions are issued frequently.

Both patterns of the U. S. Long Distance cars in different styles of equipment are illustrated and described briefly in a new booklet issued by the U. S. Long Distance Automobile Co., of New York.

Rims, hubs, ball bearing wood and wire wheels and steering knuckles comprise the text and illustrations of the catalogue being mailed by the I. A. Weston Co., of Syracuse and Jamesville, N. Y.

The Story of the Mobile is a booklet which deals with all the phases of the construction and sale of the numerous patterns of this well known steam car, from the small \$550 runabout to the handsome new steam coupe.

The J. J. Parker Co., of Fulton, N. Y., has issued a tasteful booklet describing the Parker gasoline motor.

In the truly artistic fashion which has for years characterized the advertising of the tire

THE NEW ELMORE TONNEAU



The above illustration shows the new double-cylinder pattern of the Elmore made by the Elmore Mfg. Co., of Clyde, O. As in the single-cylinder pattern, which is already well known in the trade, the Elmore system of two-cycle motor construction, which affords great simplicity is employed. While the motor is said to be actually of 10 horsepower, the weight of the complete car is but 1,450 pounds. The car is designed especially for touring and

care has been taken that the parts are readily accessible for inspection, adjustment or repair. The Elmore company expects to turn out this year 500 cars of this and the regular single seat model. The latter, incidentally, is improved in many directions, one of the most noticeable points being a three-speed forward and reverse planetary transmission gear in which all of the pinions run on roller bearings and are well enclosed.

companies, the Fisk Rubber Co., of Chicopee Falls, Mass., shows and explains the merits of the various patterns of Fisk single and double tube tires.

W. H. Newton & Son, of Cortland, N. Y., have issued two catalogues, one devoted to Excelsior tops and the other to Newton bodies, which are rapidly finding their way onto many automobiles.

The evolution of the gasoline engine, pictorially told, forms the subject matter of a folder issued by the Standard Motor Vehicle Co., 183 La Salle street, Chicago. The exposition of the subject leads to the presentation of the characteristics and advantages of the standard motor which is of the four-cylinder horizontal type with connected pistons.

The Spark Plug Picture Booklet shows in a pleasant style why the Non-stop spark plug recently introduced by A. W. King of Maywood, N. J., is a valuable addition to the parts trade.

TORBENSEN SPARK PLUG

The Torbensen Gear, Inc., of Bloomfield, N. J., is marketing under the trademark T. G. I. a spark plug of the more or less standard style of construction and for which no freak systems of preventing breakage or sooting are claimed. Good materials and careful manufacture, are, however, asserted to be exemplified in the plug. The insulating material is called by the maker "hard fire porcelain." It is made in Europe to the order of the Torbensen company, which claims that it is unaffected by high or changeable temperatures. The metal cap, instead of being more or less

securely cemented to the core, is spun onto it. The company also supplies high grade jump spark coils and other ignition specialties.

NOT RUN FOR PROFIT

E. H. Corson, 221 Columbus avenue, Boston, Mass., who is projecting the relay motor bicycle trip which was recently outlined in *MOTOR AGE*, urges motor cyclists along the proposed route to send applications for membership early. He also wishes to impress upon them the fact that a membership fee of \$1 is the only charge made, the organization of the run being entirely for the purpose of popularizing the motor bicycle, and the membership fee being charged only to pay for suitable badges and for the cost of printing and postage necessitated in managing the tour.

MELANGE QF TRADE BREVITIES

An automobile factory has been established by I. De Loura at Perry, Iowa.

An automobile stage line is to be substituted for a projected electric car line between Yazoo City and Lintonia, Miss.

The General Electric Co., of Chicago, has been experimenting with a gasoline automobile and may enter the trade.

The King's County Automobile Club, a branch of the King's County Wheelmen, of Brooklyn, now has twenty members.

The Leather & Brass Mfg. Co., of Auburn, N. Y., which specializes on automobile pumps, has recently acquired and moved into larger factory buildings.

There is being built for the Colorado Motor Carriage Co., one of the retail concerns of Denver, Col., a large garage in which no pillars will obstruct the floor space.

The Smalley Motor Co. has been organized at Bay City, Mich., with \$50,000 capital. It is comprised of local men and will erect a factory for the manufacture of gasoline motors.

The Riggs Spencer Co., of Rochester, N. Y., presents in a brightly colored hanger the comparative safety of cycling with a Cinch coaster brake and without such a convenience.

In a recent issue it was erroneously stated that the Hall touring car, made by the Hall Motor Vehicle Co., of Dover, N. J., was chain driven. The Hall car is driven by a special system of spur gears.

A Kokomo tire girl sent out to win goodwill for the Kokomo Rubber Co., of Kokomo, Ind., smiles modestly from a highly but tastefully colored poster. If Kokomo tires are of equal grade they are all right.

The Dow Portable Electric Co., of Braintree, Mass., has prepared several diagrams showing the correct methods of wiring different adaptations of Dow Coils and batteries. They are useful both to users and makers of vehicles and motor bicycles.

T. W. Temple has succeeded to the automobile and bicycle business of the McPherson Cycle Co., of McPherson, Kan. Mr. Temple has been a member of the company since 1897 and will continue to make a specialty of repairing and building automobiles to order.

SELECTIONS FROM THE CURRENT ISSUE OF PATENTS

STEERING MECHANISM

Letters patent No. 719,171, dated January 27—Herbert Austin, of Erdington, England—It is common practice in the construction of steering mechanisms of the wheel type to place the worm and worm gear, or their mechanical equivalent, at the lower end of the steering post and to transmit the movement to the steering knuckles through rigid rods with universal connections. Such construction implies more or less end thrust exerted by the transmitting rod and also a deflection of the steering links and wheels to compensate for the movement of the front axle relative to the body when traveling over irregular road surfaces. The steering post being locked by the worm or other similar gear against backward transmission, action of the front springs under traffic vibration necessarily compels any change of the relative positions of the two extremities of the transmitting rod to be compensated for by the steering wheels themselves, no telescopic action of the transmitting rod being

permissible on account of the end thrust required of it in manually changing the direction of the car.

In this invention the steering lock or worm gear is placed on the stationary front axle. There is nothing at the lower extremity of the steering post except a bevel gear and pinion, which transmit the rotation of the post to a horizontal spindle carried by the bevel gear housing. On the axle is a rigid housing which supports a vertical shaft whose upper end is provided with a horizontal, longitudinal arm that connects with the steering knuckle links in the usual manner. The lower end of the vertical shaft is provided with a worm gear which engages a worm that is mounted on a horizontal spindle. The latter is slidable in the worm by means of a feather and key-way engagement. This spindle and that driven by the bevel gear on the steering post are united by a rod or bar having a universal connection at each end.

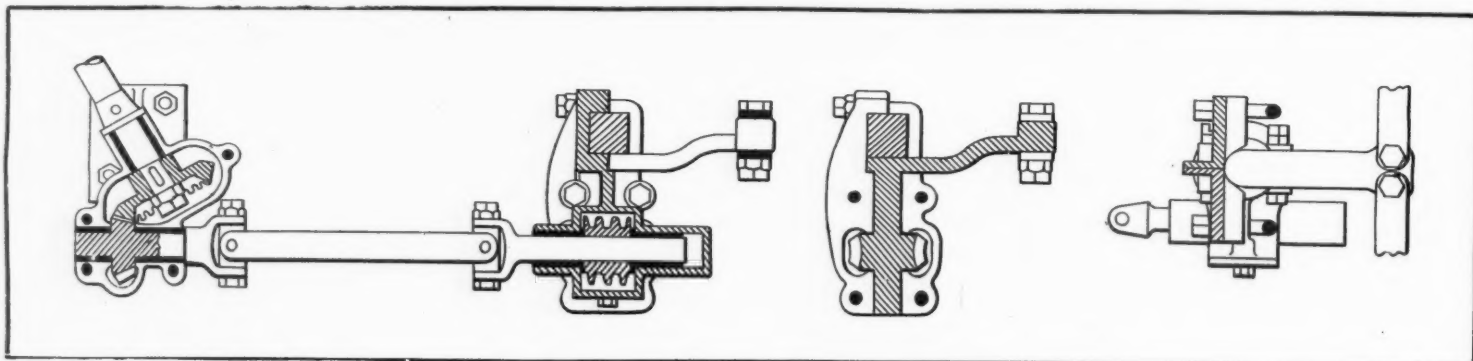
On account of the worm gear being on the axle the steering mechanism is locked at this

point against backward transmission and no end thrust is required of the transmitting rod either to sustain the re-active vibration or in manually changing the direction of the vehicle. Also, the sliding engagement between the forward horizontal spindle and the worm compensates for any change in the relative positions of the two ends of the transmitting rod when the vehicle springs are deflected.

A modification shows the employment of a two-part telescopic transmitting rod, with the forward horizontal spindle rigidly connected to the worm.

IGNITION DEVICE

Letters patent No. 719,072, dated January 27—Charles G. Annesley, of Buffalo, N. Y.; assignor to the Buffalo Gasoline Motor Co., of Buffalo, N. Y.—This is a make and break spark mechanism which is suitable for either single or multiple cylinder vertical gasoline automobile motors. The sparking points comprise the usual fixed and movable electrodes, which are placed in the head of the cylinder.



AUSTIN'S STEERING MECHANISM

The movable electrode has a laterally projecting contact finger and is carried by a tight bearing block in the cylinder head, this block being annularly grooved on the under side of its flange to engage an annular rib on the cylinder casting. This engagement of the parts is made to insure against cylinder leakage. The electrode shank passes upward through a central sleeve on the bearing block, at the top of which is placed a collar, above which, in turn, is mounted an actuating lever secured in position by a second collar. It is obvious that the collars at the top and the bevel shoulder at the bottom of the electrode prevent vertical play in its bearing.

A downwardly projecting pin on the actuating arm engages a vertical slot in the lower of the two collars, thus limiting the movement of the arm relative to the collar, while one end of a trigger spring passes through both the collar and the electrode shank and the other is attached to the actuating arm. To the end of the trigger spring that extends through the electrode collar is secured the upper termination of a spiral spring which surrounds the electrode bearing sleeve and whose lower end is fastened to the bearing block.

The igniter cam shaft extends across the top of the cylinder or cylinders and is driven by sprockets and chain from the two-to-one shaft below. The sprocket on the igniter cam shaft is provided with a pin clutch engagement so that should the motor shaft by any means be rotated in the reverse direction this movement will not be transmitted to the cam shaft and thereby cause a destructive reverse rotation of the step cams.

The igniter cam shaft is carried by a loose sleeve, which is slidably mounted in the sleeve carrying the cam shaft sprocket, the engagement between the latter two being a feather and key-way. A pin on the shaft engages a diagonal slot in the intermediate or sliding sleeve, the longitudinal position of which relative to the cam shaft is controlled by a hand lever. It is accordingly obvious that movement of the intermediate sleeve causes rotation of the cam shaft relative to the sprocket sleeve and hence adjusts the position of the abrupt faces of the electrode arm actuating cams. Secured to a shaft or rod running across the top of the cylinder or cylinders, and parallel to the cam shaft, is a stop for a backward extension of each electrode actuating arm. This stop, being rubber faced, noiselessly prevents the other end of the actuating arm from hammering upon the body portion of its step cam, the engagement occurring only when the arm rides outward on the operating portion of the cam surface.

When the actuating arm is moved by the step or incline on its coating cam the movable electrode is forced against the fixed electrode and the spiral spring is placed under full tension. The trigger spring, being formed of stiff wire, is next placed under tension by the further movement of the actuating arm; but during this further movement the latter simply turns on the electrode and its downwardly projecting pin rides in the groove formed in the collar. The pin approaching the end of its limited movement when the actuating arm is released by the abrupt rear face of the inclined step on the cam riding under the arm. This releases the trigger spring and allows the downwardly projecting pin to return to its normal position in the collar groove, after which the spiral spring

is released and the movable electrode is disengaged from the fixed electrode.

The construction of the igniter permits the spiral spring to be brought under full tension, which, when released, causes the movable electrode to be disengaged from the fixed electrode with great rapidity, thereby assuring an effective spark. The trigger spring is mainly for the purpose of yieldingly holding the actuating arm of the movable electrode against the cam; but it also assists the spiral spring in separating the two electrodes.

BUY YOUR TIRES NOW

It is said that owing to the revolutionary movements in Bolivia and Brazil, chiefly in the district of the Amazon river, the specu-

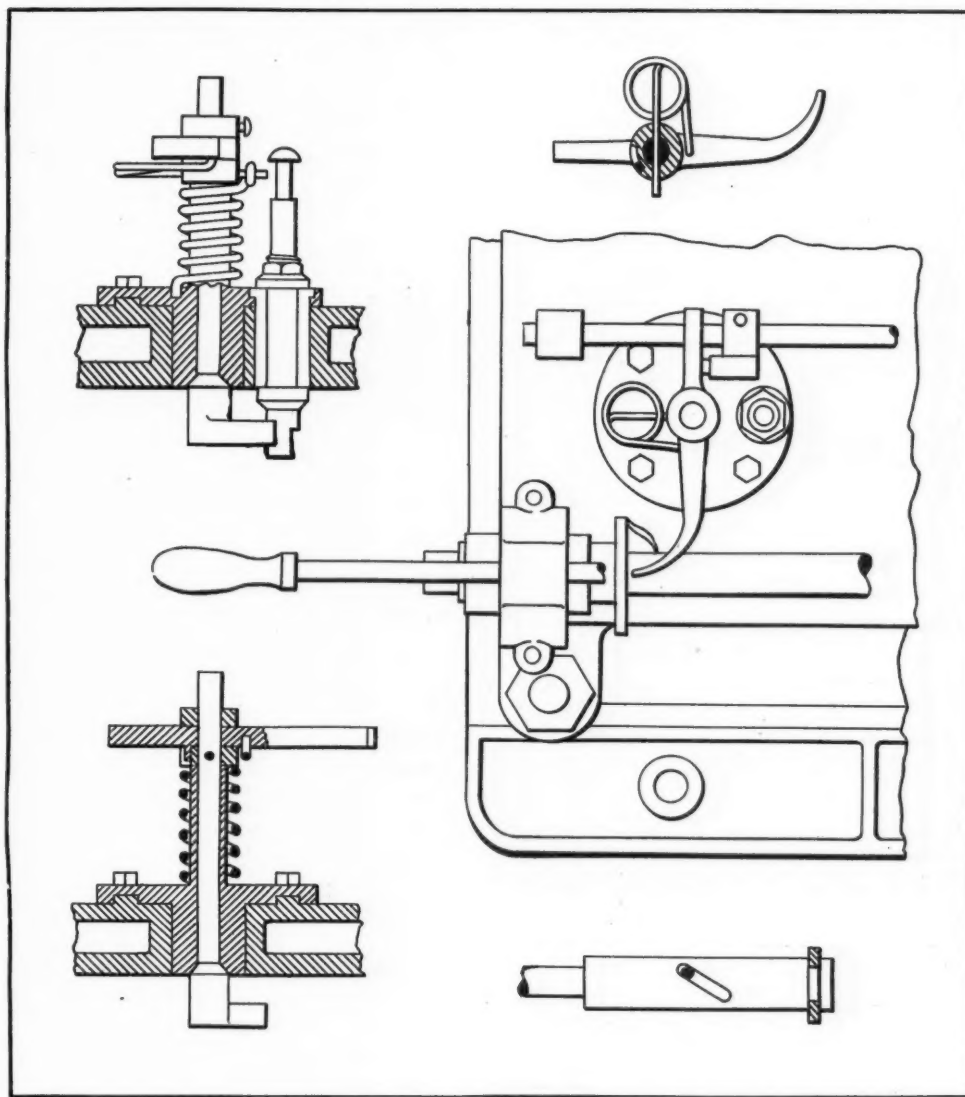
of motors is about 900 feet per minute piston velocity; that is, 900 divided by the stroke of the piston in feet, will give the maximum speed in revolutions per minute for the motor.

THE HUMANE MOTOR

Chicago, Ill.—Editor *MOTOR AGE*.—Below is a copy of a letter which I have just sent to the *Humane Journal* of Chicago. Its sentiment needs no additional explanation:

Some years ago the writer was a subscriber to your journal and paid annually for it. About one year ago, on making a subscription payment, you were officially requested to discontinue sending me the journal. Since then I have been receiving several copies and have had them returned to you through the postal department, marked "refused." They still continue to be sent to my address.

The writer is engaged in a line of occupation



MOTOR AGE

ANNESLEY'S MAKE AND BREAK SPARK APPARATUS

lators and merchants there found themselves obliged to influence the market by withholding supplies to such an extent that fine Para rubber has increased in price 30 per cent. This increase has, of course, resulted in a similar rise in the price of other kinds of raw rubber in the various continental and American markets. If, therefore, this increase is kept up for any length of time the manufacturers of rubber tires will probably find themselves obliged to raise their prices also.

GASOLINE MOTOR SPEED

Waukesha, Wis.—Editor *MOTOR AGE*.—What is the limit of speed at which a motor should run? This will, I suppose, depend upon the length of stroke.—J. E. D.

The practical working limit for the speed

that more practically tends to humanitarian work than does your journal. Probably you aim for the good of humanity in various directions. In my case, my efforts are concentrated towards humanity to the most generally used of all beasts by the human race, the horse. I am engaged in the automobile business and would suggest that your journal devote a large portion of its efforts towards furthering the interests of the automobile, on account of the vast amount of emancipation to the horse which will grow out of the continued adoption of it, both for recreation and business requirements. I also suggest that you enlighten yourselves on the recent automobile show held in New York and that you appoint a committee of your association to further enlighten themselves during the automobile show which will take place in this city from February 14 to 21.

For additional information with reference to the possibilities of taking the burden from the horse, I refer you to *MOTOR AGE*. Believing that I can better serve the beast from a humanitarian

standpoint, by advancing the interests of the automobile than by the perusal of your magazine, I would again request your removing my name from your mailing list.—K. FRANKLIN PETERSON.

COMBINATION CARBURETER

Maywood, Ill.—Editor MOTOR AGE—Can you inform me if any one is manufacturing a combined inlet valve and carbureter, such as that described in MOTOR AGE some months ago?—M. A.

MOTOR AGE does not know of any concern in the United States making this combination. The one illustrated and described was made by the Carlton Motor Co., of Cricklewood, London, England.

SPEED RATIO OF GEARING

Macon, Ga.—Editor MOTOR AGE—What horsepower should a bicycle motor develop, with 2½-inch bore and 3¼-inch stroke, running at from 1,500 to 1,800 revolutions per minute? How high should the bicycle be geared for average roads?—F. N.

The horsepower would be from 2¼ to 2½ at the speed given. A gear ratio of 6 to 1 would be about right for ordinary work.

Subscribe in Time

The Chicago
Show Issue of

Motor Age

will be the
greatest
Automobile Journal
ever printed.

February 19, 1903

MISCELLANEOUS.

Advertisements under this head 5 cents per word first insertion; 3 cents per word each insertion thereafter. Cash with order. Express orders, postoffice orders or stamps received.

FINE Upton transmissions, largest size, leather mud guards, radiators, axles, wood wheels, 32 and 34-inch, single tube tires, 30 and 34-inch; magnetos, engine cylinders, 4 and 6-inch; two 2 cylinder automobiles (experimental machines). This material was purchased at a bargain and will be sold at one-third cost. H. P. Coleman, 46 Hancock St., Boston, Mass.

FOR SALE—Prescott steam automobile: new from factory in September, 1902. Oneida automobile Co., Oneida, N. Y.

FOR SALE—One fourteen-inch tube boiler, Kelley one-piece cast burner and generator cheap. A1 shape. Address E. E. Sly, Norwalk, O.

FOR SALE—Hoffman motor, 8 h. p., for \$100. Good reason for selling. Reinke, 103 State St.

FOR SALE CHEAP—Thomas Tonneau touring car; new; fine condition; a bargain. T. Sherow, Millbrook, N. Y.

A LARGE MACHINE SHOP—Fully equipped with the latest machine tools, located near New York City, would be glad to undertake the manufacture of a quantity of automobiles or parts for the trade. They have in their employ a force of men who thoroughly understand the design and construction of gasoline, steam and electric automobiles and are therefore thoroughly competent to properly handle such business on a large scale and in a first-class manner. Address M. C., Motor Age.

FOR SALE—Locomobile No. 2, in first-class condition; Marsch steam air pump attached, or would consider trade on Oldsmobile. Box 370, Harrisburg, Pa.

FOR SALE—Steam dos-a-dos models, new, our own make, all improvements. Big reductions to make room for spring stock; also Locomobiles, Toledos and Oldsmobiles, second-hand, cheap. Kline Cycle & Auto. Co., No. 12 North Market Square, Harrisburg, Pa.

AUTOMOBILE FOR SALE—Imported, new, light, elegant gasoline machine: latest design; below cost if quickly disposed of. Chicago Automobile Garage Co., 243 Michigan Ave., Chicago.

SECOND-HAND AUTOMOBILES FOR SALE—Clearing out for spring stock. Electric Vehicle Co., 1421 Michigan Ave., Chicago.

SECOND-HAND AUTOMOBILES—Toledos, steam, \$550 up. Mobiles and Locomobiles, steam, \$250 up. Spaulding gasoline, \$550. Olds-Columbias, both gasoline and electric, Haynes-Appersons, Fournier-Searchmonts, White's Waverlies, at equally low prices. Send for our catalogue of second-hand machines. Mississippi Valley Automobile Co., 3927 to 3939 Olive St., St. Louis, Mo.

AUTOMOBILES bought, sold and exchanged. C. A. Coey & Co., 5311 Cottage Grove Ave., Chicago, Ill.

WANTED—More igniter troubles. We fix them with our improved Sta-Rite spark plug and Sparksee. Detroit Motor Works, Detroit, Mich. tf

FOR SALE—Woods electric runabout; can be seen at 270 S. Clinton st. tf

FOR SALE—The Murray gasoline runabout; the strongest and most powerful light runabout on the market; price \$650; no trouble to demonstrate. We have a great bargain in a new steam runabout of well known make. A fine second-hand Oldsmobile, 1902 model, run only about 300 miles, and practically new, for \$500. Other bargains in gasoline and steam machines from \$150 up. Write for descriptions of bargains or tell us what you want. Mead Cycle Co., 1243 Wabash Ave., Chicago. tf

TWO COLUMBIA WAGONETTES, MARK XI, with two extra sets of batteries, all in fine condition and splendid working order. Originally cost \$5,500. Bargain if sold immediately. Address, James Mills, Newark, Ohio. tf

AUTOMOBILES MADE, repaired and remodeled. Engines and transmission for sale. Wall & Benson, 268 Oak St., near Clark, Chicago.

CAPITAL WANTED—For manufacturing hydrocarbon automobiles, by mechanic with exceptional experience, holding valuable patents; thoroughly tested experimental machines. Investigate. Address N, care Motor Age.

FOR SALE—I am going to Europe for summer, and will sell my \$2,000 Mobile steam touring carriage for \$1,200 cash; guaranteed in perfect condition; will seat six. E. W. Mick, 221 E. Adams St., Chicago.

FOR SALE—One Spaulding gasoline runabout. Has been run about 400 miles. The reason for selling, want a larger car. Address F. L. C., 94 Exchange St., Rochester, N. Y.

FOR SALE—1902 Oldsmobile with full leather top, Dos-a-Dos seat, storm apron, two brass lamps, \$500. Also Murray car, used only for demonstrating purposes, for \$490. Other machines, such as Fournier-Searchmont, Remington, Duryea and Baker at bargain figures. Largest stock in Chicago to select from. Coey & Co., 5311 Cottage Grove.

BARGAINS—1902 Winton Touring Cars, 1902 Winton Phaetons. All in guaranteed first class condition. Your check gets one if you are quick. Chas. Howard Tucker, 1400 Michigan Ave.

WILL sell 1902 Winton Touring Car, perfect condition, absolutely satisfactory, to make stable room for this year's model. Howard Alexander, Elizabeth, N. J. tf

FOR SALE—11x36-in. Star Lathe, with fixtures: good condition, \$70.00. Would trade for good motorcycle. Also enameling oven, and M. & W. vulcanizer cheap. H. A. Persey, Elizabeth, Minn.6

FOR SALE

Three Mobiles, A-1 shape, \$195.00 each; Winton Touring Cars; Oldsmobiles; Haynes-Appersons; Remingtons; Ramblers; Columbia Electrics; Waverly Electrics; National Electrics; Locomobiles; Mobiles; in Runabouts and Touring Cars; Winton semi-racers; Winton Phaetons; Motor Bikes, etc

Big clearance sale at reduced prices, to sell quick. Send 5c in stamps for the first and largest complete catalogue of second-hand automobiles ever issued. Contains half-tone photos and full description of 35 first-class vehicles at bargain prices.

We buy, trade for and sell more automobiles than any house in the U. S.

Get our list.

The Fisher Automobile Co.
Indianapolis, Ind.

A Large Machine Shop

Fully equipped with the latest machine tools, located near New York City, would be glad to undertake the manufacture of a quantity of

Automobiles or Parts for the Trade....

They have in their employ a force of men who thoroughly understand the design and construction of gasoline, steam and electric automobiles, and are therefore thoroughly competent to properly handle such business on a large scale and in a first-class manner.

Address, M. C., Motor Age.

At South Bend, Ind.,

FACTORY FOR SALE



Ready for immediate use
Complete with line shafting, steam and WATER POWER, electric light plant, automatic fire protection, dry kilns, side tracks, and offices

Ten Acres of Land

Ten minutes' walk from the center of South Bend, a city composed of the best class of satisfied workmen.

Suitable for iron and woodworking, textile fabrics, or

AUTOMOBILES

Five trunk railroads. A rare opportunity. Well illustrated descriptive circular on application.

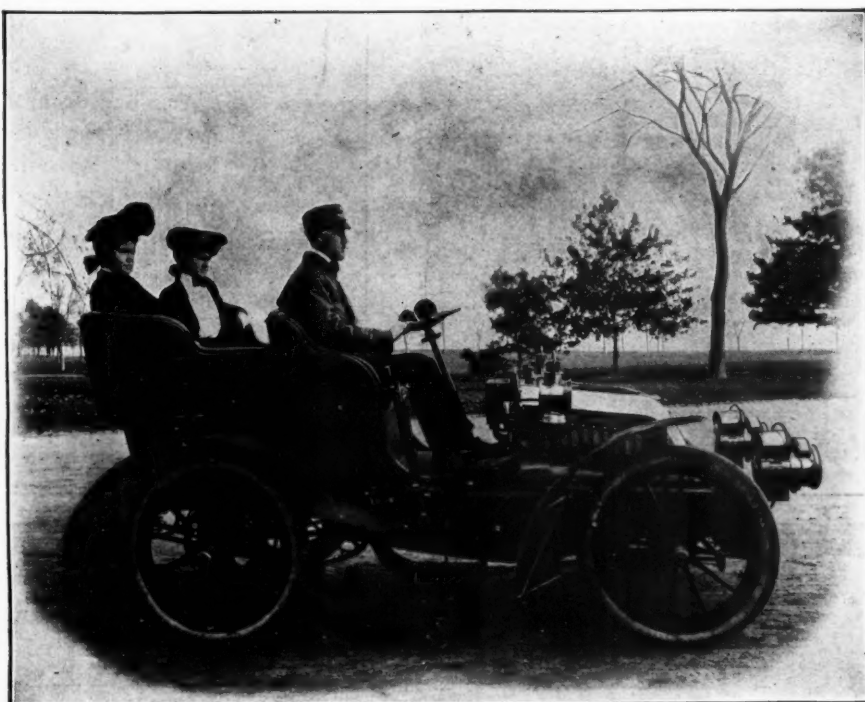


The Singer Mfg. Co.,

South Bend,
Ind.

THE *Locomobile* COMPANY

The merit of a gasoline car depends not only on the design but on the workmanship and the manner in which the details are carried out. The design of our new gasoline cars is the very best; there are absolutely no undesirable features. It is only by examining our cars, however, that you can get an idea of the workmanship and the great attention to details. We will exhibit both our 9 h. p. and 16 h. p. cars at the Chicago Show, Feb'y 14 to 21. Write for full information.



The 16 h. p. Locomobile Touring Car. Aluminum Tonneau.
Front Vertical Gasoline Motor, four cylinders.

**EASILY THE BEST CAR
BUILT IN AMERICA**

THE *Locomobile* COMPANY

OF AMERICA,
7 East 42nd Street, NEW YORK.



Lexington Hotel

Michigan Boul. and 22d St.

Chicago.

....AUTOMOBILE.... HEADQUARTERS

DURING EXHIBITION

Five blocks from Coliseum. Cable cars pass the door. Building absolutely fire-proof. Cost, with furniture, \$1,200,000 :: :: ::

RATES, European, . . . \$1.00 per day and up
" American, . . . \$3.00 " " "

Correspondence Solicited
Long Distance Telephone in Each Room

GEORGE B. ROSS, Prop'r.



"IT" The Flash BOILER

Manufactured by **The Barton Boiler Co.**

Office and Factory, 4112-4230 State St.

CHICAGO, U. S. A.

Long Distance 'Phone, 1540-1541.

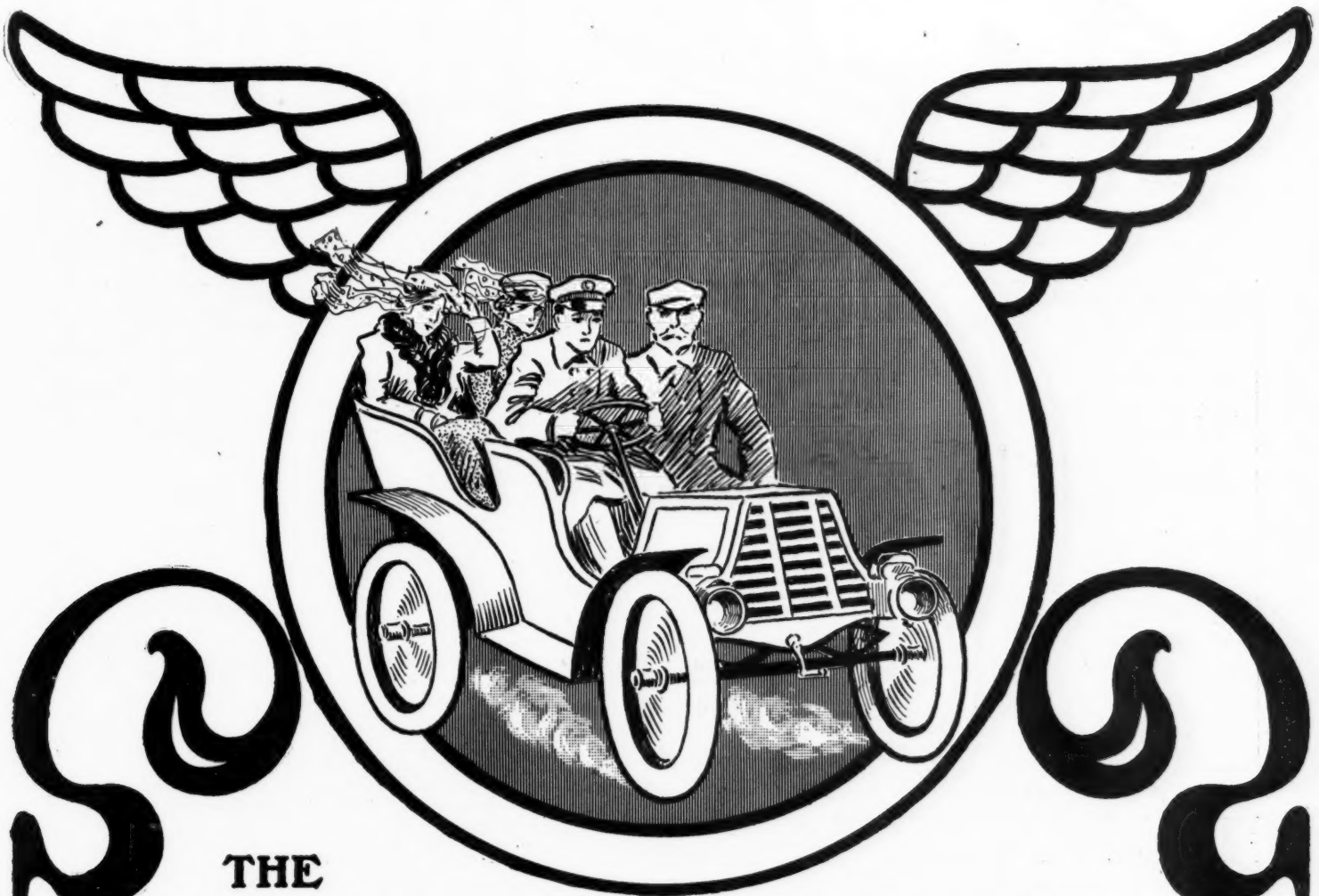
Will Exhibit at Chicago Auto Show
..SPACE 159..



CANVASSERS WANTED

For Subscription Department of MOTOR AGE, in Indiana, Michigan and Ohio.
Salary, Commission and good Territory to good men. Others need not apply.

MOTOR AGE, Monon Building, Chicago.



**THE
PLEASURES OF AUTOMOBILING**

WILL BE GREATLY ENHANCED BY THE USE OF

HARTFORD or DUNLOP PNEUMATIC TIRES

**The ORIGINAL and "MODEL" TYPES of SINGLE
AND DOUBLE TUBE TIRE CONSTRUCTION**

Appreciating the fact that requirements vary as to Single Tube and Detachable Tire Construction, we offer the most reliable of both types—*The Honest Standards.*

**THEY WERE BEST YEARS AGO, AND YEARS OF INTELLIGENTLY PERSISTENT,
CAREFULLY DIRECTED EFFORT HAS MADE THEM BETTER TO-DAY.**

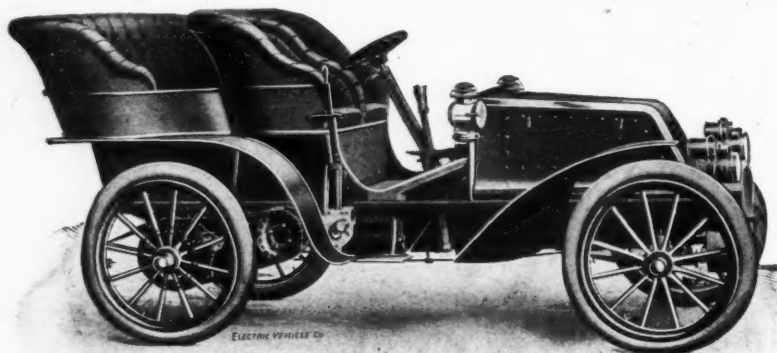
Where Quality is desired—where Comfort, Durability, and Protection against Annoyances is wanted—where All-round Satisfaction is demanded—these tires should be adopted. Let us prove this to you by sending you signed statements from some of the most prominent makers and users in this country.

The Hartford Rubber Works Company, Hartford, Conn.

Columbia Automobiles

New Models for 1903

24 H. P.
Columbia
Gasoline
Touring
Car



Most
Efficient
and
Hand-
somest
American
Car

A thoroughly American machine for American roads. All parts of engine and running gear instantly accessible. All parts interchangeable. All screws and bolts have standard threads. Noiseless running. Drop forgings throughout. 4-cylinder vertical water cooled engine. Thorough drive on high gear. Single lever for all speeds. Four speeds forward and one reverse. Speeds four to forty-five miles per hour. Two double acting brakes. New style Tonneau body, seating five persons. All body furnishings and fittings of COLUMBIA quality.

**Columbia
"Seabright"
Runabouts,
Victorias,
Surreys,
Tonnesaus,
Cabriolets,
Opera Busses
and Broughams**

Which were so unqualifiedly successful during 1902, have been perpetuated with numerous improvements.

See Our Exhibit at
Chicago Shows

The COLUMBIA line for 1903 includes the following new vehicles

Columbia Light Electric Runabout

New form of Underslung Battery, leaving body entirely open.

Columbia Rear Driven Coupe

Containing distinctive features of both the Brougham and Hansom types.

Columbia Inside Operated Coupe

Dispensing with necessity for separate driver. Especially desirable for Physicians.

Columbia Special Delivery Wagon

For inspectors, superintendents, fire and police chiefs, and others requiring high-powered electric automobiles for hard service.

Delivery Wagons and Trucks

Entirely new models containing many exclusive features, adapted to all kinds of commercial uses.

Catalog Will Be Sent on Request, Also Special Bulletins With Complete Detailed Information for Each Vehicle Separately

Electric Vehicle Company, HARTFORD, CONN.

New York Salesroom, 134-136-138 West 39th St.

Boston, 43-45 Columbus Ave.

Chicago, 1421 Michigan Ave.

The STEARNS CAR DID MAKE A HIT



For General Appearance, Style and Finish

A quiet running motor with a perfect throttling device. A three speed transmission that is right, and all parts easy of access for all adjustments. The arrangement of attachments on the dash and controls at the steering wheel also found favor with all. The new Radiator with tanks for 200 miles running is a step in advance. Think it over seriously. IT IS THE CAR TO BUY.

THE F. B. STEARNS CO., Cleveland, O.

Cadillac Auto Co. of Illinois, 1312 Mich. Ave., Chicago, Western Distributors

GOODRICH CLINCHER AUTOMOBILE TIRES

Original American Clincher Leads

There were more Goodrich Clincher Double Tube Automobile Tires fitted to machines on exhibition at Madison Square Garden Automobile Show, Jan. 17-24, than any other individual make of Clincher Double Tube style of tire.

Important! With hardly an exception, all machines at Show using OUR Clincher Tires were Heavy Touring Cars of High Power and Speed, requiring Tires of exceptional strength and quality. That is why Goodrich Clinchers were made the tire equipment. They have been thoroughly tested and their superior merits acknowledged. Write for booklet of testimonials, mailed to any one upon application.

Here is the Record

Winton Motor Carriage Company, . . .	4	Machines
White Sewing Machine Company, . . .	5	"
Peerless Motor Car Company, . . .	4	"
Pan-American Motor Company, . . .	3	"
Pope-Robinson Company, . . .	3	"
The F. B. Stearns Company, . . .	1	"
Packard Motor Car Company, . . .	1	"
Smith & Mabley, . . .	3	"
Berg Automobile Company, . . .	2	"
The Walter Car Company, . . .	3	"
Franklin Mfg. Company, . . .	2	"
The Shelby Motor Car Company, . . .	2	"
American Motor Car Company, . . .	2	"
Hoffman Automobile & Mfg. Company, . . .	2	"
Fredonia Mfg. Company, . . .	2	"
U. S. Long Distance Automobile Company, Locomobile Company, Geo. N. Pierce Company, Spaulding Motor Car Company, H. P. Hall Motor Company, Moyea Automobile Company, one machine each.		
Baker Motor Vehicle Company, 6 machines, ALL fitted with Palmer Special Speed Automobile Tires, OUR Make.		
Ajax Motor Company, 2 machines, fitted with Goodrich Single Tube Motor Tires.		

RECAPITULATION

Goodrich Clincher Tires equipped . . .	47	Machines
Palmer Special Tires equipped . . .	6	"
Goodrich Single Tube Tires equipped . . .	2	"
	55	

Total, 55 Machines

THE B. F. GOODRICH COMPANY

Factories, - Akron, Ohio

BRANCHES:

NEW YORK, 66-68 Reade Street
CHICAGO, 141 Lake Street
SAN FRANCISCO, 392 Mission Street

PHILADELPHIA, 922 Arch Street
DETROIT, 80 E. Congress Street
BUFFALO, 9 West Huron Street

DENVER, 1444 Curtis Street
BOSTON, 157 Summer Street
LONDON, ENG., 7 Snow Hill, E. C.

SPORT. PASTIME.
INDUSTRY. MECHANICS.

Good Literature

RELATIVE TO ALL BRANCHES
... IS SUPPLIED BY ...

Two
Dollars
a
Year.

Sample
Free.



MOTOR AGE

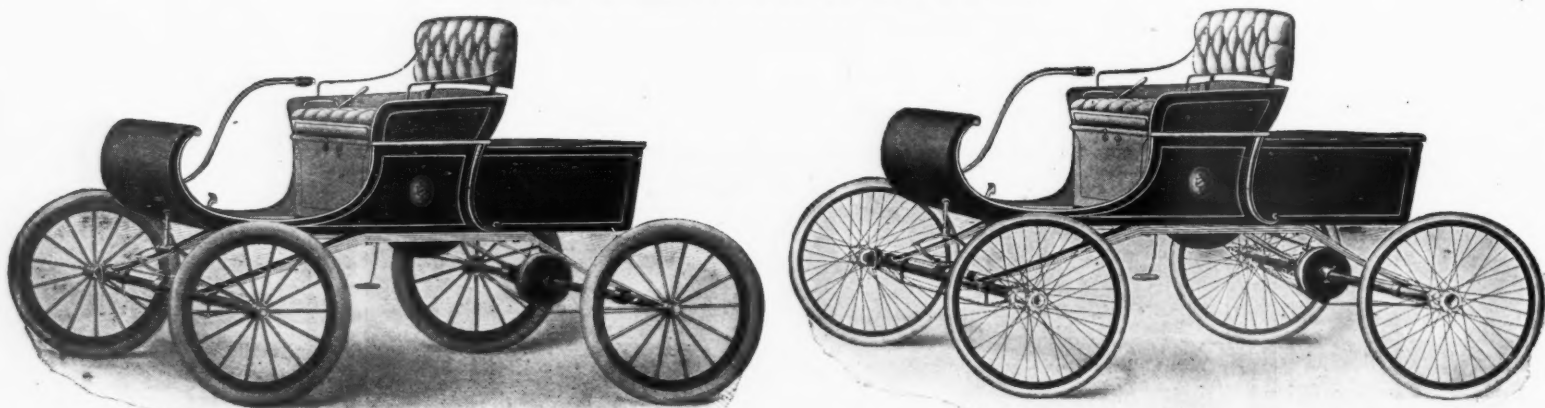
It covers all branches of
automobiling. :: :: ::

Excellent typography.
High grade illustrations.

MOTOR AGE, 405 Monon Bldg., CHICAGO

The Oldsmobile

THE CAR WITH A RECORD



To see one is to admire its appearance; to own one is to thoroughly appreciate its splendid perfection

Made in the largest and best equipped automobile factory in the world. Each detail of its strong and simple construction is the result of twenty-three years' experience in gasoline motor building. Each working part is made from the best drop forgings, with the result that the Oldsmobile is "The best thing on wheels."

PRICE, \$650

Every part of this mechanical marvel is made or finished in our own factory by the most skilled automobile specialists. Built on unique lines under patents covering all the essential parts, its sterling merit cannot be copied by imitators. There is nothing problematical in the Oldsmobile—it "goes."—It gives absolute satisfaction and is still the cheapest *reliable* automobile in the world.

Our statements are proven by the evidence of the Oldsmobile's 7,000 drivers. Practical everyday service means more than all the theoretical argument and experimental efforts of the "paper manufacturers."

SELLING AGENTS:

Oldsmobile Company, Los Angeles, Cal.
Oldsmobile Co., New York City, N. Y.
Nat. Capital Automobile Co., Wash., D. C.
Quaker City Automobile Co., Phila., Pa.
H. B. Shattuck & Son, Boston, Mass.
Banker Bros. Co., Pittsburg, Pa.
Oldsmobile Co., Cleveland.
Oldsmobile Co., Githens Bros. Co., Chicago.
Fisher Automobile Co., Indianapolis, Ind.
Olds Gasoline Engine Works, Omaha, Neb.
W. C. Jaynes Auto. Co., Buffalo, N. Y.
F. L. C. Martin Co., Plainfield, N. J.

Autovehicle Co., Newark, N. J.
F. W. Stockbridge, Paterson, N. J.
Mississippi Val. Auto. Co., St. Louis, Mo.
George E. Hannan, Denver, Colo.
Day Automobile Co., Kansas City, Mo.
Clark & Hawkins, Houston, Tex.
Hyslop Bros., Toronto, Ont.
The Oldsmobile Co., C. C. Moore & Co., San Francisco, Cal.
John W. Chester Co., Nashville, Tenn.
A. F. Chase & Co., Minneapolis, Minn.
J. E. Richard, Columbus, S. C.

Oldsmobile Co., Milwaukee, Wis.
Rochester Auto. Co., Rochester, N. Y.
Seager & Close, Tucson, Ariz.
F. E. Gilbert, Jacksonville, Fla.
Texas Imp. & Machine Co., Dallas, Tex.
Abbott Cycle Co., New Orleans, La.
C. H. Johnson, Atlanta, Ga.
Sutcliffe & Co., Louisville, Ky.
Brown-Thompson & Co., Hartford, Conn.
Mason's Carriage Works, Davenport, Ia.
Adams & Hart, Grand Rapids, Mich.
Kline Cycle & Auto Co., Harrisburg, Pa.

Agency for Great Britain, The Oldsmobile Company of Great Britain, 100 C Queen Victoria St., London, E. C.

WRITE FOR INFORMATION AND ILLUSTRATED CATALOGUE TO

OLDS MOTOR WORKS,
1300 Jefferson Ave. ♣ ♣ ♣ **Detroit, Mich.**

G & J TIRES

Make the most practical and satisfactory automobile equipment. They will stand hard service; are resilient and speedy; easily repaired if punctured—and they don't puncture easily.



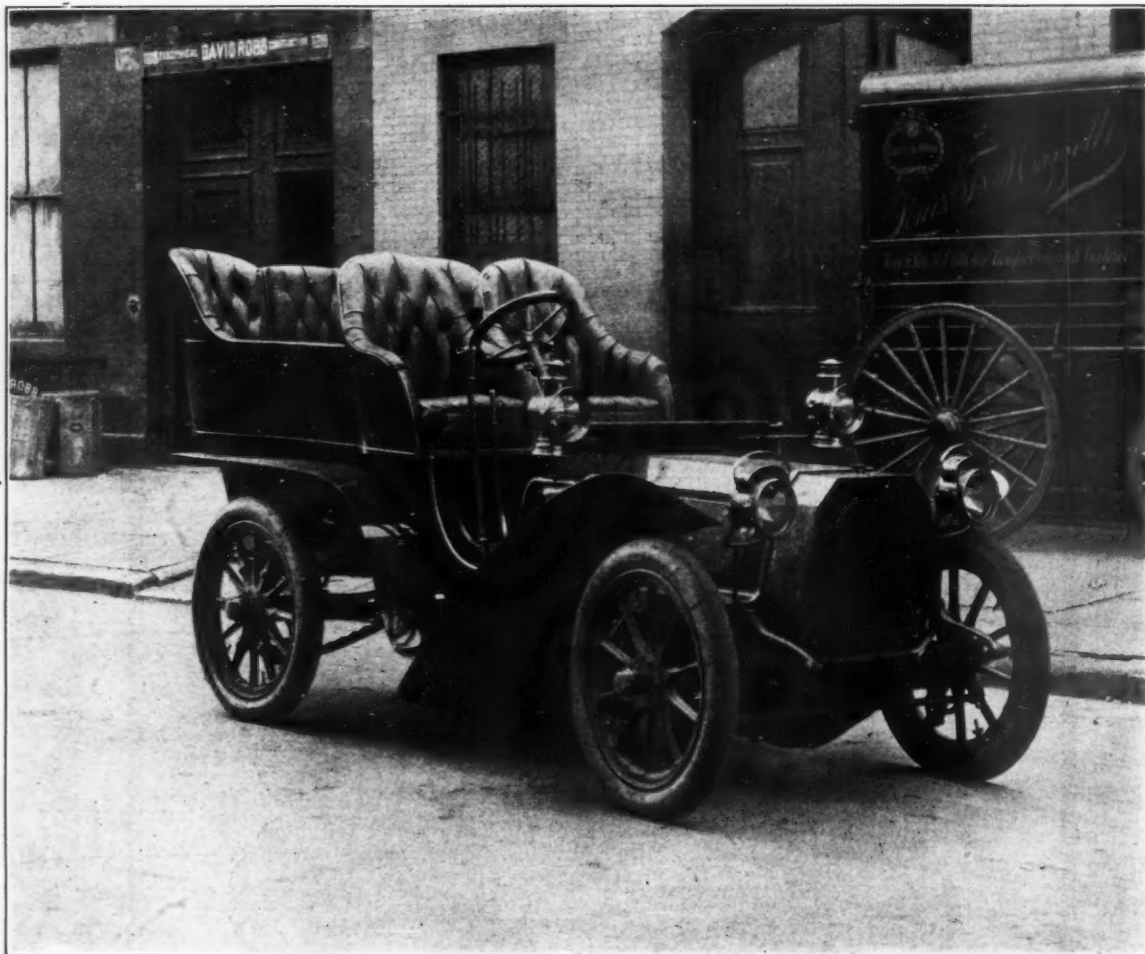
Detachable tires are being adopted by all automobile makers for 1903. G & J automobile tires stand at the head of the class as reliable tires of unquestioned quality.

Chicago Show: Feb. 14-21.

G & J TIRE CO.

INDIANAPOLIS, IND., * * * U. S. A.

A SHOW FAVORITE



THE MOYEA TOURING CAR

Met with instantaneous approval from experts and the general public. The powerful motors, beautiful workmanship, and finish, high grade material and simplicity of mechanical design makes the machine the center of interest.

PRICE \$5,000.

Deliveries in early Spring.

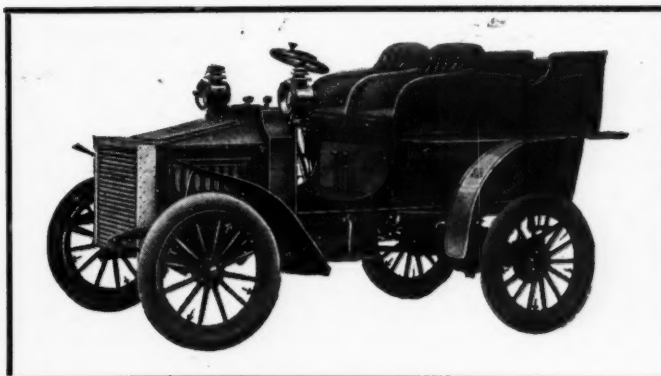
Moyea Automobile Co., 3 West 29th St., New York.

White Steam Touring Car

FOR 1903

Is a Steam Car of Chassis Construction with the Distance of a Gasoline and the Ease of Operation of an Electric

TO the principle of producing great power and wasting practically none of it is due much of the success of the **White**, which of all automobiles has to its credit four first awards in the New York - Rochester endurance test of 1901; four first awards in the New York - Boston - New



York reliability run of 1902, and its perfect scores for reliability in the great English 650-mile reliability trials of 1902. But one other car achieved this distinction in the English Trials. These marvelous triumphs may be taken as an accurate criterion of the "White's" supremacy.

SPECIFICATIONS

Price, \$2,000

SEATING CAPACITY	Four	TREAD	4 ft. 8 in.	EXTREME LENGTH	10 ft.
RATED HORSE-POWER	Ten	WHEELS	30 inches	EXTREME WIDTH	5 ft.
ENGINE	Compound	TIRES (Goodrich Clincher)	4 in.	EXTREME HEIGHT	5 ft. 2 in.
WHEEL BASE	6 ft. 8 in.	WEIGHT (Tanks filled)	1,600 lbs.	CAPACITY GASOLINE TANK	10 gals.
		CAPACITY WATER TANK	15 gals.		

Condenser, Two Independent Set of Brakes, Automatic Cylinder and Engine Lubricator.
Equipment—Condenser, Side Lamps, Set of Tools, Horn, Tool Case.

SUCCESS in every-day use, in reliability contests, in races, and in record trials, has proved the "White" system of motive power to be the most noteworthy achievement of automobile developments. The 1903 "White" is equipped with every improvement which our experience has shown would be of advantage to the car. Greater power and economy, and greater ease of operation, combined with noiselessness has always characterized it.

These advantages are secured by means of a compound engine, the "White" special condenser, a chainless drive, automatic cylinder and engine lubrication, two independent sets of brakes, and a variety of minor improvements, which assure the "White" purchaser that his vehicle possesses a system of producing and conserving energy unexcelled in the automobile realm.

Safety is the "White" keynote. The "White" as is now well understood, has no boiler, and a boiler explosion is therefore impossible. The power of the "White" car is produced in a generator, in which the possibility of accident is non-existent.

The working parts being entirely encased, the "White" is impervious to mud and dust; while its operating parts are so arranged that a lady need have no fear of soiling even a glove in running the car.

WHITE SEWING MACHINE COMPANY

(Automobile Department) CLEVELAND, OHIO

22 Union Square, New York
509 Tremont Street, Boston, Mass.
300 Post Street, San Francisco, Cal.
212 Woodward Avenue, Detroit, Mich.

609 Main Street, Buffalo, N. Y.
300 Rose Building, Cleveland, O.
4259 Olive Street, St. Louis, Mo.
1761 Stout Street, Denver, Col.

5979 Centre Avenue, East End, Pittsburg, Pa.

Banker Brothers Company, Cor. Vine and Broad Streets, Philadelphia, Pa.

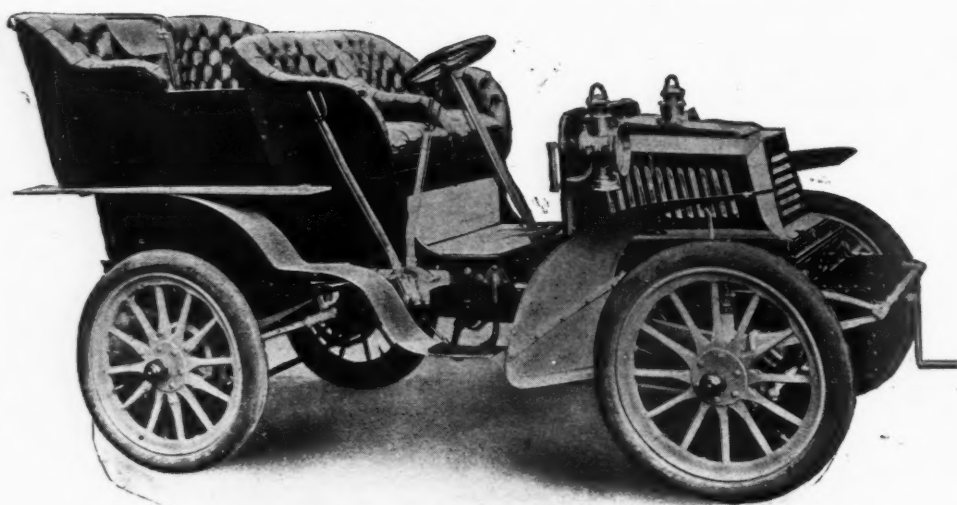
Walter C. White, European Representative, 19 Princes Street, Westminster, London, England

AMERICA'S LEADING AUTOMOBILE

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T*The Searchmont.*

1903 MODEL. TYPE VII.

"HOW can you sell such a car for \$2,500 when others ask \$4,000 to \$10,000 for cars so similar to yours?" is a question often asked at our exhibit in the New York Auto Show. We make them in large quantities and are content with a reasonable profit. Read the description of the various cars at the show in the trade or daily papers and compare the Searchmont with others. Do not pay \$4,000 or more for an Automobile until you have seen the SEARCHMONT.

SEARCHMONT
AUTOMOBILE CO.

Philadelphia, U. S. A.

AGENCIES:

John Wanamaker, New York and Philadelphia.
Githens Bros. Co., Chicago. H. B. Shattuck & Son, Boston. W. E. Metzger, Detroit.
Rochester Automobile Co., Rochester.

*The Searchmont.*T
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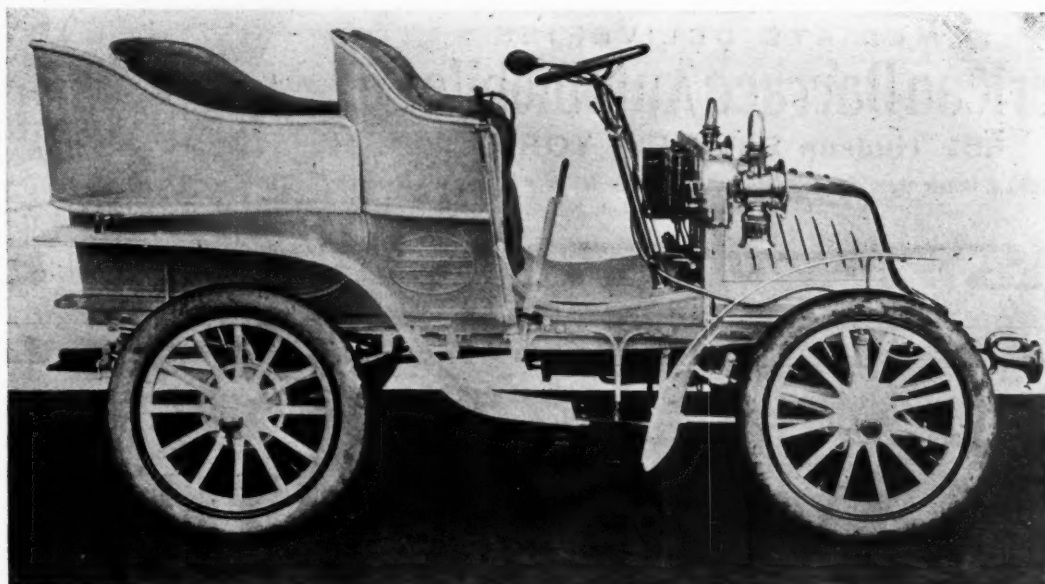
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EAMERICA'S LEADING AUTOMOBILE

They All Wanted German Ideas

So said all dispatches and editorials on the Paris show. The French maker now knows that the German is ahead in construction.....

A high class German car **THE CUDELL**



Noiseless, One, Two and Four Cylinder Types. 6 and 8 H. P. Motorette, Three Speeds and Reverse. 12 and 16 H. P. Tonneaus, Four Speeds and Reverse. Chainless. We Invite Inspection. Instruction Given to Intending Purchasers. Compare Our Prices With Others. All Duplicate Parts In Stock.

Full Cars, Single Lever Control, Double Suspension. Trucks and Delivery Vans.

J. C. BRANDES,

U. S. Agent for Cudell & Co., Aix les Chapelle.

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NEW YORK.

Garage, The Motor Vehicle Repair and Storage Co., 121-123 West 31st St., New York.
Storage and Supplies. :: Agents Wanted Everywhere.

....THE NEW.... DARRACQ

1903 MODELS.

The Sensation of the Paris Show.

New transmission, new styles, no vibration, noiseless, new ignition system, new valve system, chainless drive, large wheels, large tonneaus and latest improvements in French motor car construction.

The Darracqs Hold More Records than Any Other Car

8, 9, 12, 16, 20 and 24 Horse Power.

Darracq Motors Sold Separately.

See our Delivery Wagons.

Seventy-five per cent of the Automobiles imported in this country during 1902 were Darracqs, and were sold by this company.

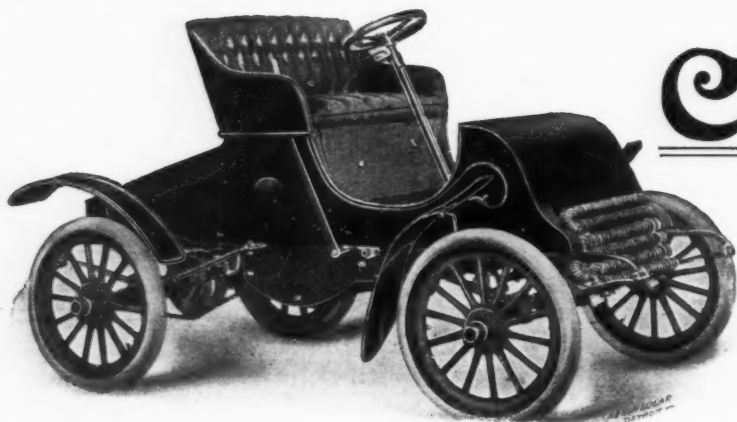
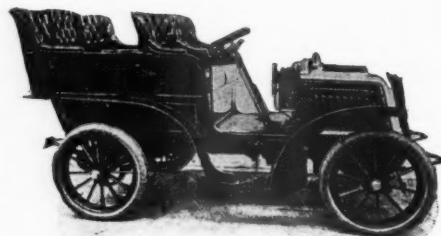
IMMEDIATE DELIVERIES

American Darracq Automobile Co.

652 Hudson St., NEW YORK.

We will exhibit at Chicago Show.

Our Chassis was the feature of the New York Show.



THE

CADILLAC

\$750

With Tonneau \$850

The Best Proposition for 1903

THE FOLLOWING AGENCY LIST PROVES IT.

Cadillac Automobile Co. of Illinois, Chicago, Ill.
Cadillac Company of New York, New York City.
John Wanamaker, Philadelphia, Pa.
William E. Metzger, Detroit, Mich.
Conrad Mueller Co., Indianapolis, Ind.
Vance Automobile Co., Minneapolis, Minn.
American Cycle Manufacturing Co., Boston, Mass.
American Cycle Manufacturing Co., Providence, R. I.
American Cycle Manufacturing Co., Washington, D. C.
Cleveland Automobile & Supply Co., Cleveland, Ohio.
Oscar S. Lear, Columbus, Ohio.
Centaur Motor Vehicle Co., Buffalo, N. Y.
Crescent Automobile Co., Jersey City, N. J.
New Jersey Automobile Co., Newark, N. J.
A. T. Wilson, Denver, Colo.
R. V. Connerat, Savannah, Ga.
Michigan Automobile Co., Grand Rapids, Mich.

Houghton Implement Co., Grand Forks, N. Dak.
Peckham Carriage Co., Dayton, Ohio.
The Hanauer Automobile Co., Cincinnati, Ohio.
F. O. Bailey Carriage Co., Portland, Me.
Norman W. Church, Los Angeles, Cal.
R. W. Whipple, Binghamton, N. Y.
Theo. Jonas, Milwaukee, Wis.
Adolph A. Giesel, Springfield, Mass.
Birney A. Robinson, Worcester, Mass.
James Lucey, Albany and Troy, N. Y.
Fred A. Mabbett & Co., Rochester, N. Y.
Irvin W. Dill Carriage Works, Harrisburg, Pa.
Brown, Thomson & Co., Hartford, Conn.
Charles E. Whitten, Lynn, Mass.
Murphy Bros., Erie, Pa.
Hyslop Bros., Toronto, Ont.
Elmira Arms Co., Elmira, N. Y.

CADILLAC AUTOMOBILE CO., Detroit, Mich.

William E. Metzger, Sales Manager.

Catalogue for the Asking.

How About Your Runabout?

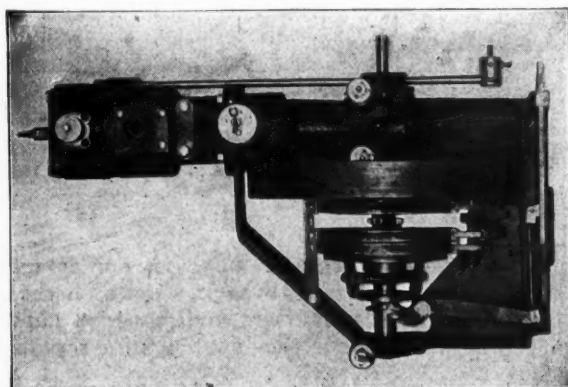
HAVE YOU AN EFFICIENT MOTOR?

We have and are anxious to tell you how you can improve your construction. We advocate their use in 1000-lb. vehicles, but they are doing 20 miles per hour in machines that weigh 1250. Transmission providing two speeds, forward and reverse, fitted to shaft, thus making the motor ready to install in the vehicle.



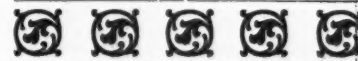
Come and investigate. It will be time and money well spent.

The prices are in keeping with the quality.



If you are looking for cheap goods, look elsewhere.

We try to and do make the best motor of its class.



We provide engines without transmissions if desired. Also Champion transmissions, differential gears, roller bearing axles, chains, sprockets, artillery wheels, tires, etc. Our new catalogue is now being compiled. Send your name and address for one when ready for mailing.

THE P. J. DASEY CO.,

19 and 21 La Salle St.

Mfgs. Agents.

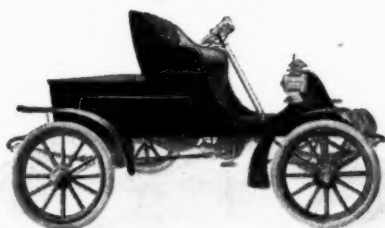
CHICAGO, U. S. A.

CHICAGO SHOW:
Spaces 47-48 Coliseum

**YOU NEED IT
IN YOUR BUSINESS**

CHICAGO SHOW:
Spaces 47-48 Coliseum

The Elmore Automobile....



is the most simple, practical and reliable car ever put on the market. It is propelled by the famous Elmore motor, whose two cylinders have fewer parts than a single cylinder of any other type.

Either engine will propel carriage should the other be cut out. (A very important fact.)

Has dynamo and storage battery. Motor will start and carriage will run on either. (Another important fact.)

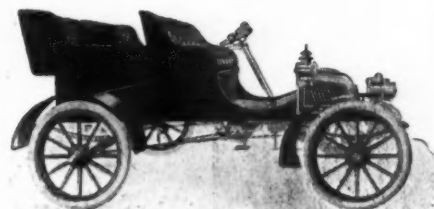
You can charge the battery from the dynamo while running the carriage, which is another important fact.

Has had a practical test of over three years' manufacture.

Two first-class certificates in New York-Boston Endurance Run. Have been used in 1000-mile tours without trouble. And still more important facts.

Doctors' and Business Men's favorite car, Model 7, \$800

Tonneau Touring Car, Model 8, \$1400



.....LOOK UP! WRITE! INVESTIGATE!

ELMORE MANUFACTURING COMPANY

Member of National Association
of Automobile Manufacturers....

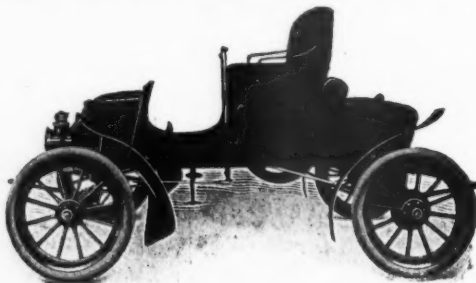


Clyde, Ohio

Men of Muscle

are not required to operate it. It starts at the first turn of the crank, and runs until you stop it, controlled by the pressure of the thumb. This description fits only the

Rambler TOURING CAR



Equal in appearance and service to the \$2,500 kind, but at one-third the price. Six horse power, 78 inch wheel base, artillery wheels, three-inch tires, drum brakes on rear wheels acting independently of the chain; constant-level automatic carbureter; these are a few of the points that make it the best value for the money on this or any other market.

Price, F. O. B., Kenosha, Wisconsin, **\$750**

Illustrated Catalogue Mailed on Request.

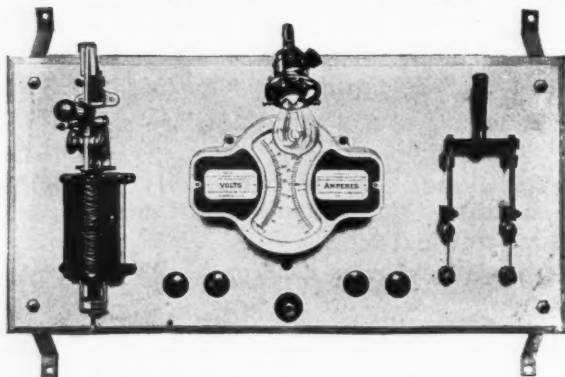
THOMAS B. JEFFERY & CO.

Spaces 87 and 88 at
Chicago Automobile Show.

KENOSHA, WISCONSIN.

Westinghouse Automobile Charging Apparatus For Station and Individual Use.

In standard Units assembled from well-tried apparatus. Details of established excellence.



Westinghouse 110 Volt Direct Current
Individual Charging Panel.

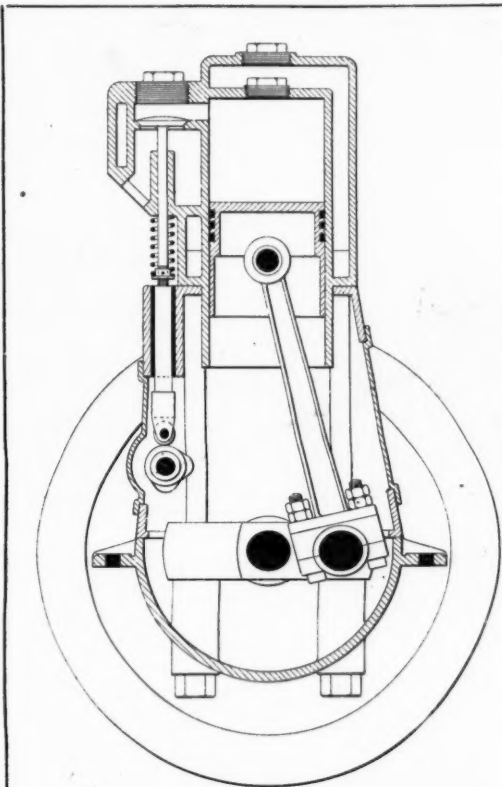
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and see our Exhibit

Booth 156,
Coliseum, Chicago,
February 14th
to 21st, 1903.

Westinghouse Electric & Mfg. Co., Pittsburg, Pa.

Sales Offices in all Large Cities.

Standard Automobile Motive Power Equipments. Circular 1059.



Here's a Motor that's Just Right!

You will be surprised at our prices if you get our catalog.

Take no chances on buying inferior goods. Always get the best.

No waiting. If you want to get a first-class motor, write today.

Risk a postage stamp. It will pay you to find out what we have.

Two sizes only, two and four cylinders, of 8 and 16 B. H. P. respectively.

National Automobile & Motor Co.
OSHKOSH, WISCONSIN.

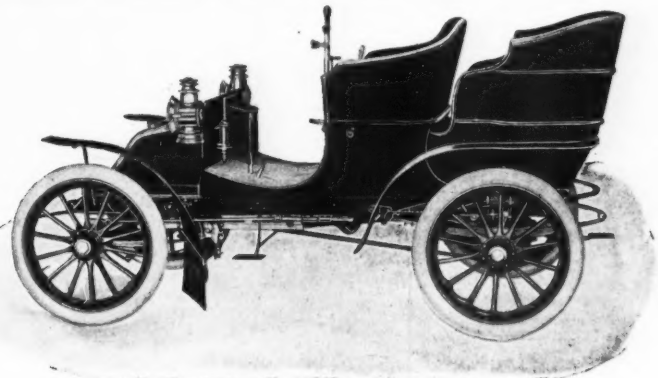
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IT'S A MARVEL!!!!

That is what they all say....

To cut a long story short, look it over.

Any of the following agents will send catalogue and even give you a trial spin,



10 H. P. Gasoline Motor.

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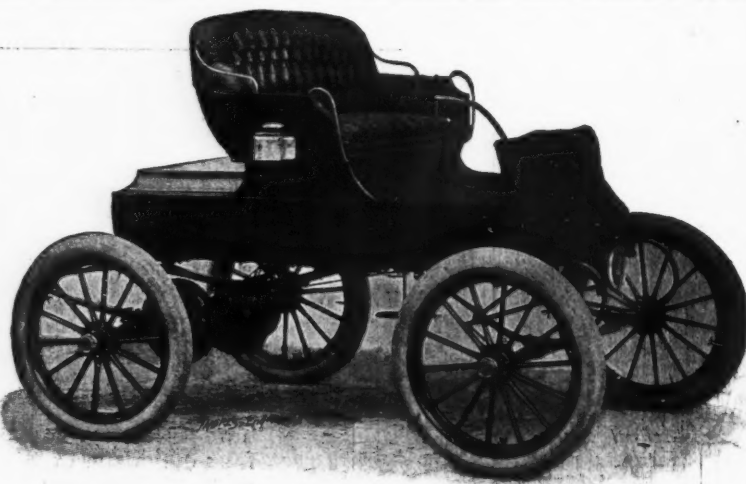
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A NEW ONE

10 Other
Models for
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All leaders in
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MODEL 100 SPECIAL

This Vehicle
the Most
Powerful
Electric
Runabout on
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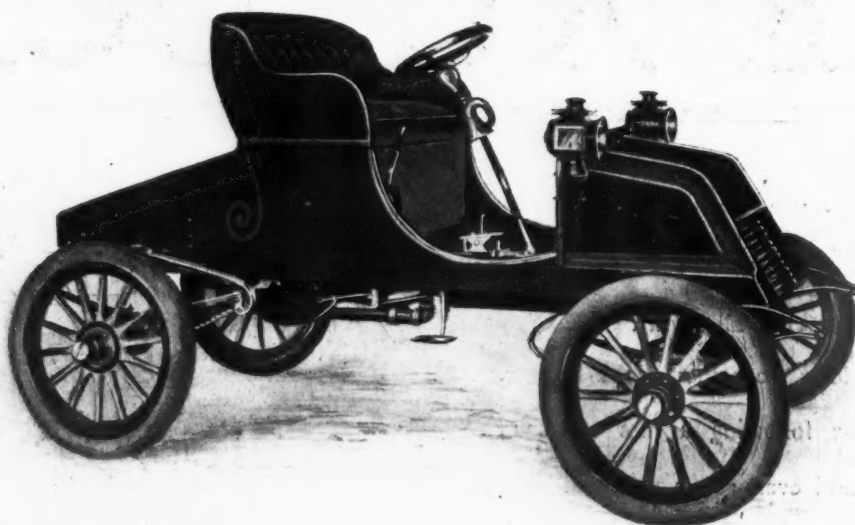
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Agents wanted in unoccupied territory.*

*"The Cadillac Automobile Co., of Illinois,
1312 Michigan Ave. Distributors for the
City of Chicago."*

National Motor Vehicle Co.
1200 E. 22d St.....INDIANAPOLIS, IND.

THE GENERAL.

Inexpen-
sive to
Buy.



Inexpen-
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Run.

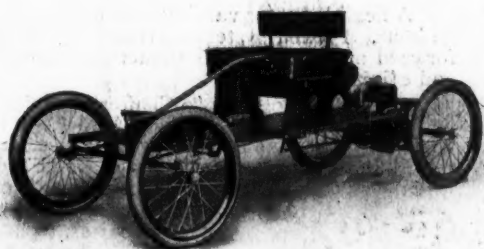
for all Seasons

A MODERATELY priced runabout, the equal of any high priced machine on the market. The 8 h. p. engine makes it as serviceable on country roads as upon city streets—the simple mechanism and easy control make it a machine any one in the family can operate—the mechanical lubricators make oiling unnecessary and render it clean and desirable. Agents in principal cities.

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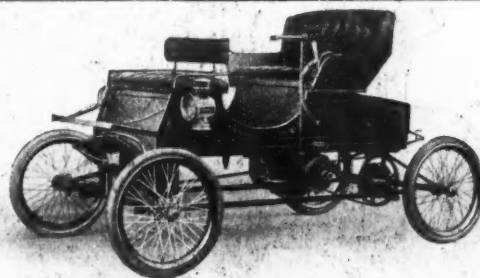
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MODELS OF 1903



ORIENT BUCKBOARD.

4 H. P. Speed 30 miles per hour. Weight only
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The lightest and simplest Automobile in the world.



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8 H. P. Speed 30 miles per hour. Weight
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Powerful, practical and durable. Easy to operate.

Now is the Time to Secure the Agency.

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"The Wheel That's True."

A Complete Wheel Cinch.

"My New Year offering to science," said the "Wizard," "is my storage battery on which I have worked four years. It will be put on the market this month. It solves the traction problem. Its introduction means that the horse will have to go."

BUT

whether it be electricity, gasoline or steam,
you've got to have

The Midgley Wheel.

It is of tubular steel and is guaranteed. In ordering your 1903 automobile specify the Midgley Tubular Steel Wheel. It is safer, lasts longer and is more economical in every way. Write us for literature.

The Midgley Mfg. Comp'y
COLUMBUS, OHIO, U. S. A.

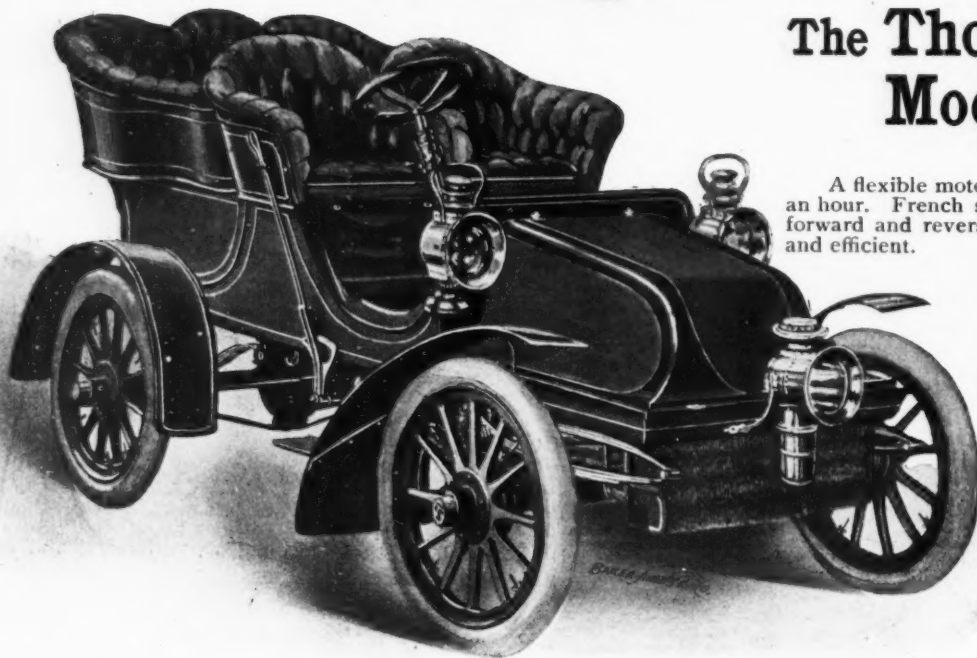
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A Search Light Flash will reveal the altogether superiority of

The Thomas Tonneau Model No. 18

"King of Belgium Body."



A flexible motor varying in speed from 4 to 25 miles an hour. French system of transmission, three speeds forward and reverse. Construction throughout simple and efficient.

No Chaffeur required to run this machine. Model No. 18 carries all the proven improvements of the day, a few of which are wide tread, long wheel base, wood artillery wheels (our own special design), detachable tires, sight feed multiple pressure lubricator, jump spark and throttle control, slow and fast speed carbureter, and wheel steer.

This Automobile will take all roads and climb any accessible grades.

Agents desired in unoccupied territory.

Will exhibit at the Chicago Show.

Price \$1,400.

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(Buffalo Automobile & Auto-Bi Co.)

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BUFFALO, N. Y.



IT WAS THE LAMP
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NEW YORK SHOW

ATWOOD "STAY-LIT" LAMP Outclasses Them All

Why Use a Backnumber or Experiment,
Either Are Unsatisfactory.....

THE "STAY-LIT" has earned its high reputation and is the best and swellest Automobile Lamp on the Market. The large number of contracts taken indicates that the trade knows a good thing.

ATWOOD MFG. CO., Makers,

Amesbury, Massachusetts.



Tail Lamp.

Studebaker Electric Automobiles



**NO EXPERT
CHAUFFEUR
NEEDED.**

**CAN BE RUN
ANY DAY IN
THE YEAR,
BY ANY
MEMBER OF
THE FAMILY**



WIDE TOURING RADIUS.

A 1903 electric vehicle with a battery which is durable and will give a run of 40 miles on one charge.

A SUCCESSFUL HILL CLIMBER.

Our machines will climb grades which are not only steep but covered with sand and mud.

SMOOTH OPERATION.

Controller has four speeds, allowing an unusual smoothness of operation in starting.

RELIABLE BRAKE CONTROL.

All machines equipped with two brakes.

STRENGTH OF CONSTRUCTION.

Built to be worthy in every point of the Studebaker name and reputation.

Studebaker Electric Automobiles will be exhibited at the Chicago Automobile Show, and can be seen at the following repositories of the

STUDEBAKER BROS. MFG. CO.

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FIRST-CLASS AGENTS DESIRED
IN TERRITORY NOT ALREADY COVERED.

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CHICAGO AUTOMOBILE SHOW

Coliseum, Feb. 14-21.

REDUCED RAILROAD RATES.

The Central Passenger Association
Western Passenger Association
Trunk Line Association
New England Association

have granted reduced rates on account of the good Roads Convention of the National Association of Automobile Manufacturers, to be held at the Coliseum, Chicago, during the Chicago Automobile Show, Feb. 14 to 21, 1903.

These associations cover all the territory between Cheyenne, Wyo. (including all points in Colorado) and the Atlantic Coast.

Note These Instructions Carefully.

On purchasing ticket for the trip to Chicago, ask the ticket agent for a certificate on account of the Good Roads Convention of the National Association of Automobile Manufacturers.

On your arrival at the Coliseum present it at once to the railroad agent who will be in attendance from Monday to Saturday. He will certify that you have been in attendance, but it is necessary for him to know that there are at least 100 holders of certificates, hence the necessity of delivering them to him immediately on arrival.

Your certificate when presented at the depot will entitle you to buy your return ticket at one-third of the regular fare.

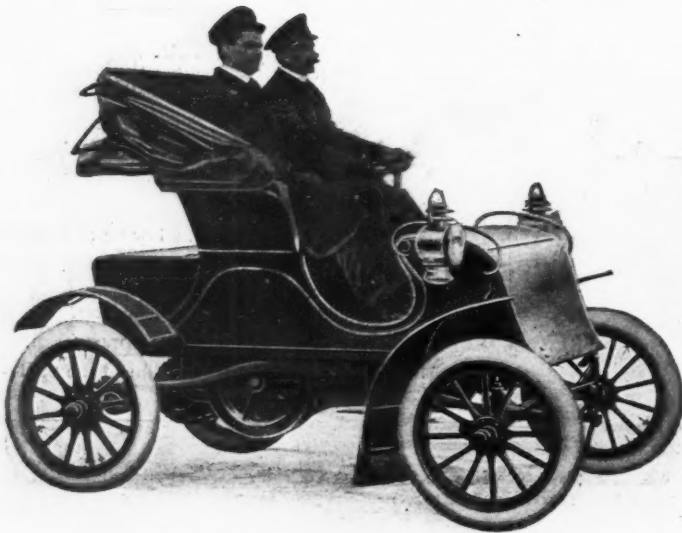
Tickets for return journey will be furnished only on certificates dated not more than three days before the opening of the convention, nor more than two days after the first day of the convention, and presented within three days after convention closes. Sunday will not be reckoned as one of the three days either before the opening date or after the closing date, and all return tickets will be for continuous passage.

EVERY PROMINENT MAKER WILL EXHIBIT.

Morning Sessions Free to the Trade.

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Waterless Knox



1903 Model now ready, with many new and desirable features, much stronger and more durable in every detail than the 1902 Model. The ideal runabout, touring car and doctor's carriage combined.

**Will Exhibit at
the Chicago Show**

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CONRAD GASOLINE AUTOMOBILES

Will Be at Chicago Automobile Show, Feb. 14 to 21.

...RUNABOUT...

8 H. P. Double Cylinder Vertical Motor in Front. Sliding Gear Transmission. 2 Speeds and Reverse. Wheel Steer etc.
Price \$750.00.

2 Models

Will Be Shown in Detail in Subsequent Issue of this Paper.

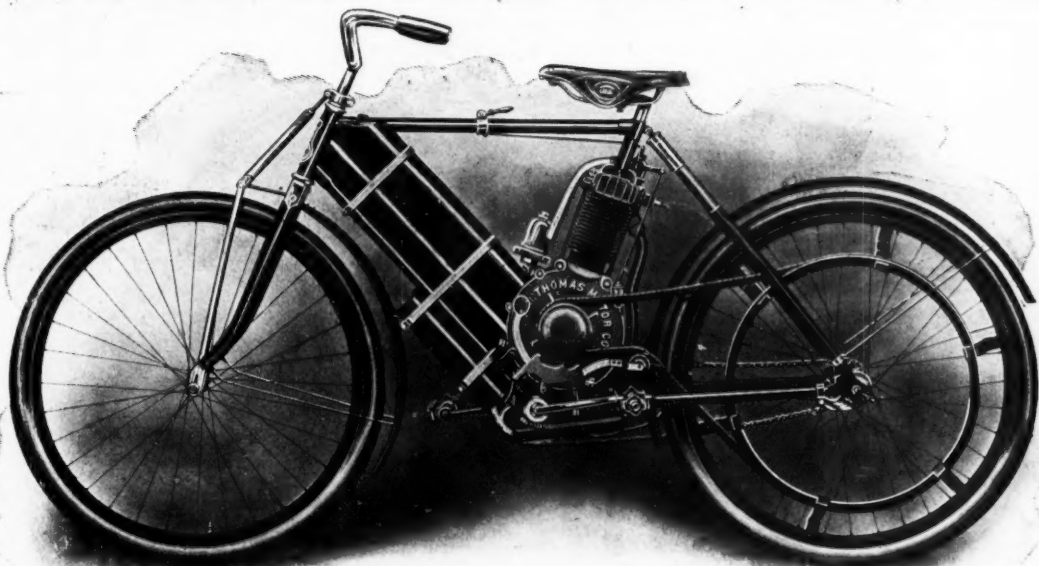
..Touring Tonneau..

12 H. P. Vertical Double Cylinder Motor in Front, Sliding Gear Transmission, 3 Speeds and Reverse. Wheel Steer. Wood Artillery Wheels 30x3½ Detachable Tires. Price \$1250.00

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1411-1417 Niagara Street, * * * * * BUFFALO, N. Y.

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Price \$200

Spring Truss Forks

Hygienic Cushion
Frame

Thomas Steel and
Leather
Non-Stretchable
Belt

All the hitherto vexatious problems of Entire Strength and Safety, Transmission, Hill Climbing, Comfort and Speed on Country Roads, Vibration and General Utility have been solved and with leaps and bounds the Thomas Auto-Bi takes its place far ahead of all competitors. Agents should apply at once in order to secure early delivery.

Will be at the Chicago
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E. R. THOMAS MOTOR CO.

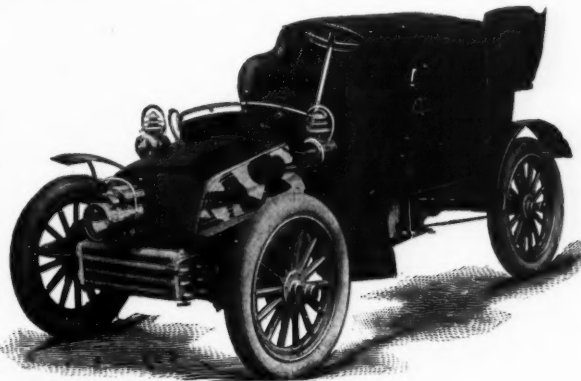
(BUFFALO AUTOMOBILE & AUTO-BI COMPANY)

BUFFALO, - - N. Y.

Results at the New York Show Prove The "YALE" Motor Car a Success

WE DEMONSTRATED TO ALL COMERS AND DID BUSINESS.

A RATIONAL
VEHICLE
AT A
RATIONAL PRICE
\$1750
NO VARIATIONS



SIMPLICITY
STRENGTH
ELEGANCE IN
DESIGN
THOROUGHNESS IN
WORKMANSHIP

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JAMES LUCEY, Troy, N. Y.
HYSLOP BROTHERS, Toronto, Ontario.

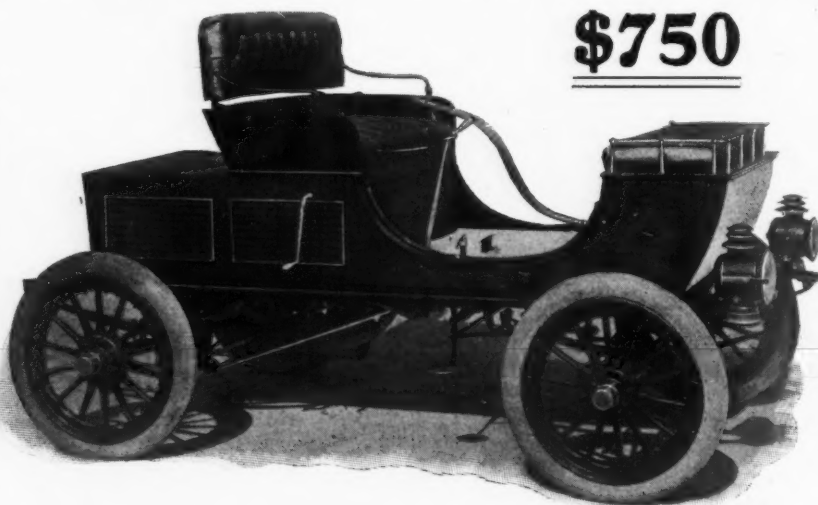
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THE KIRK MFG. CO., Toledo, O.

CENTURY TOURIST GASOLINE MOTOR CAR

\$750

Acknowledged
by
Experts to be the
Best and Most
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Money Offered
in an
Automobile.



Orders
placed now
insure
Spring Delivery.

Write
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Catalogue.

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PROVIDENCE, R. I.:
H. G. Martin & Co.

CHICAGO, ILL.: 293 Wabash Avenue,
Ralph Temple & Austrian Co.

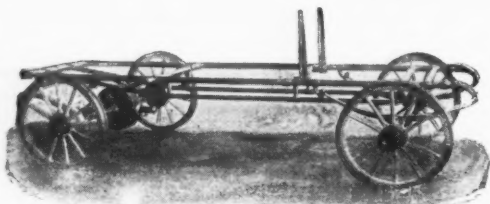
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WYOMA GASOLINE MOTOR.

Single Cylinder, 8 H. P., 135 pounds.
Double Cylinder, 15 H. P., 265 pounds.



TUBULAR RUNNING GEAR FOR TONNEAUS.
82-inch Wheel Base. 52-inch Tread.

Reading Automobile & Gear Co.

TENTH AND EXETER STREETS
READING, PA.

— MANUFACTURERS OF —

Gasoline Motors, Differential Spur Gears,
Transmission Gears, Tubular Running
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Wheels, Carbureters : : : : : :

Our Motors are of French Type and Equal in Finish and
Service to Best Foreign Makes.

The Differential Gear has Manganese Bronze Bevel Gear.
Fitted for either 1 1/4, 1 1/2 or 1 3/4 inch axles. Is made for Direct
Drive, Rod Transmission.

The Transmission Gear is built on a
new system. No Bevel Gears. Gears
always in Mesh. Ball Thrust at each
end of shaft. Enclosed in Aluminum
Case. Will transmit up to 20 H. P.

We make a Tubular Running Gear for
Tonneaus that is a marvel of workman-
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extra heavy. The Differential on this
is fitted for either Sprocket or Bevel
Gear.



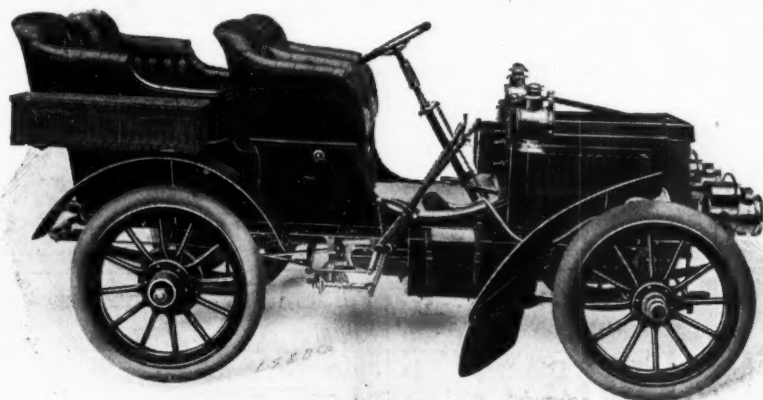
WYOMA DIFFERENTIAL
SPUR GEAR.

8 pitch, — 60 Teeth.



WYOMA TRANSMISSION GEAR.
3 Speeds forward and 1 Reverse.

THE PEERLESS

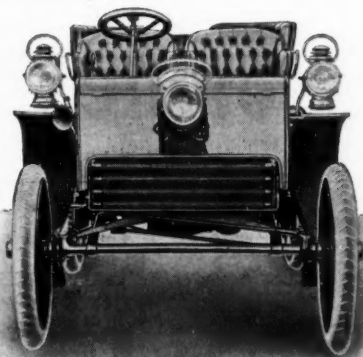


One year ahead of them all, 16 h. p. Motors mounted on front. Slide gears. Universal shaft, bevel gear transmission. Governed Motor, foot control. Catalog tells the rest, mailed on request.

The Peerless Motor Car Co. CLEVELAND, OHIO.

“Packard”

The System of Oiling on the Packard Motor Car



\$2,500

is not so saving of the oil (and grit) as is the splash system but an examination of any bearing will find it

clean and sweet and with a coating of clear oil. It is only the man who has worked with both hands and two wrenches through a small hand hole until he became thoroughly plastered with the black dope that can wholly appreciate the full meaning of splash lubrication.

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Ralph Temple & Austrian Co.

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Franklin

4 Cylinders, Air Cooled. SEND TO US FOR IT.

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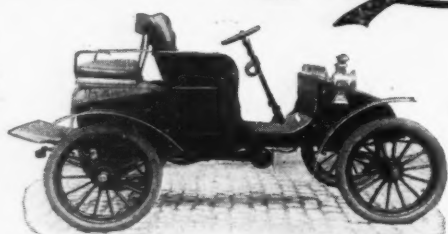
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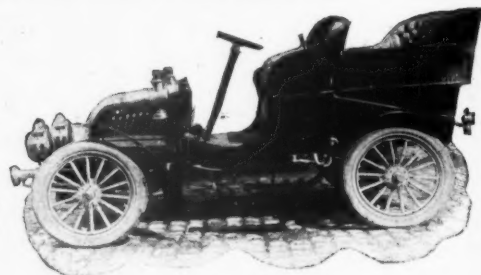
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U.S. Long Distance AUTOMOBILES



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STANDARD
FOR RELIABILITY

The Book is now Ready



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Automobile Parts —AND— Westfield Automobiles



MODEL "G," WITH TONNEAU SEATS.

Complete Line of the Highest Grade Running Gears and Bodies on the Market. All the Latest Designs. Also Full Line of Parts. Satisfaction Guaranteed.

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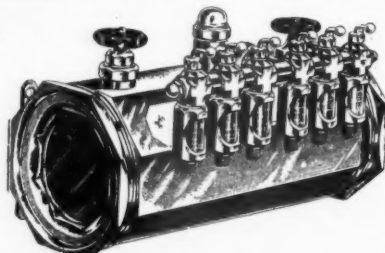
The C. J. Moore Mfg. Co.

BRANDENBURG BROS. & ALLIGER
Sole Selling Agents

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Don't complete your 1903 equipment without including a *Lubricating System*, automatic, economical and reliable.

Up-to-Date
Oiling
Devices
for
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Explosive
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SIMPLEX
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Automatic
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AUTOMATIC LUBRICATOR CO.

1134 Caxton Bldg.,

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The Original, Not the Copy

Buy it from

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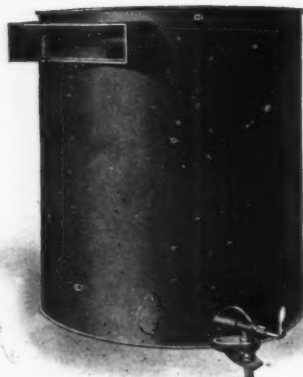
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WITH A WORLD WIDE REPUTATION

Highest Awards
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BRANCHES
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Do not let them say that they have a Boiler just as good, but insist on having a

Salamandrine NEVER BURN OUT Boiler

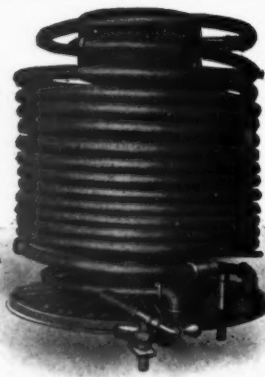
in your new carriage, or have one installed in your present carriage, and it will give 50 per cent more pleasure and efficiency than your present boiler


A good many users of our boilers are running their carriages without a water glass. Our Boiler will be exhibited by P. J. Dasey Co., at Spaces 148-151, Chicago Show.

SALAMANDRINE BOILER CO., 220 Broadway, New York
WORKS: NEWARK, N. J.

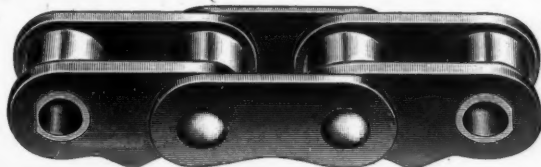
Boiler Complete, Ready for Installation.

Boiler Showing Burner and Connections






**Accuracy &
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**Fine Pro-
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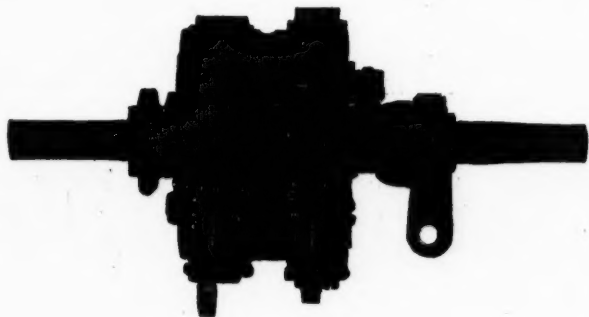
INVESTIGATE "WHITNEY" CHAINS AT THE CHICAGO AUTOMOBILE SHOW.

WHITNEY" STANDARDS for Dimensions of Roller Chains Will Soon Be the American Standards if The Con-
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THE WHITNEY MFG. CO., Hartford, Conn.



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The Upton Machine Company announces that it is the owner of U. S. Letters Patent as follows:

649,026, dated May 8, 1900.
686,786, dated Nov. 19, 1901.
687,172, dated Nov. 19, 1901.
687,173, dated Nov. 19, 1901.
691,507, dated Jan. 21, 1902.
691,508, dated Jan. 21, 1902.

And has other patents pending. These patents relate to gearing and other Automobile Appliances.

Notice is hereby given that **infringers will be prosecuted** to the full extent of the law.

Upton Machine Co.
Beverly, Mass.



No. 1.

—AN—
**AUTOMOBILE
NECESSITY**

Adjustable Lifting

B-B JACKS

Manufactured by

Bray Manufacturing Co.

Incorporated

NEWARK, — N. J.



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THOR MOTORS....

and complete set of fittings are ready for delivery. No machinery necessary to complete Motor Cycles from these parts. *There are hundreds of purchasers for Motor Cycles where there is one for an Automobile.* Motor Cycles will sell all summer.

Write for full particulars to the salesmen,

BRANDENBURG BROS. & ALLIGER,
85 Lake St., Chicago. 103 Reade St., New York.

Aurora Automatic Machinery Co.
AURORA, ILL.

"See Us at the Chicago Show"



BUFFALO STANHOPE.

It is conceded that there was nothing exhibited in Madison Square Garden Automobile Show that approached it for beauty of design or quality.

Selling Agents for New York City:
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GITHENS BROS. CO., 1412 Michigan Ave.

Buffalo Electric Carriage Co.

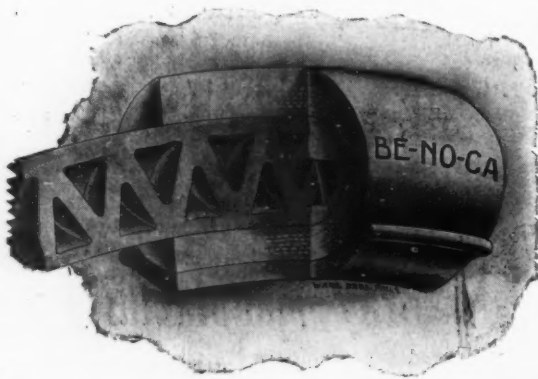
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BUFFALO, N. Y.

"BE-NO-CA"

(TRADE MARK)

Known to the trade as the
**BEASLEY ELASTIC
TIRE**



Built on the truss principle, it's strong and the strain is equally distributed.

Ample resilient yet defies destruction or disabling by puncture.

Can be used until completely worn out.

Standard Anti-Friction
Equipment Co., No. 50 Broadway
New York City.

The Moore Independent Automobile Pump

*We never miss the Pump
Till the Boiler runs dry.*



Class 0-1

THE above cut represents the Single Pump Boiler Feeder, single-acting plunger type.

Steam end is tapped in three places for steam, one place for drip; plug can be changed to any of three places, or drip can be taken from any not used for steam. Steam end can be located in *any horizontal position*.

Water end must be located so delivery shall be vertical as relates to the valves. Exhaust can be taken out at any angle.

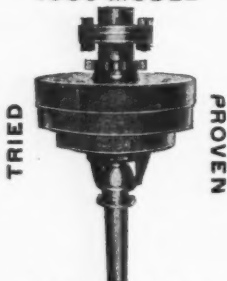
Manufactured by the

"Union" Steam Pump Company

BATTLE CREEK, MICHIGAN

The Champion Transmission

1903 MODEL



Patented March 4, 1902

Two Speeds Forward and One Reverse, Made in Three Sizes.

No. 1— 3 to 5 brake horse power, price	\$65.00
" 2— 5 to 10 " " " "	75.00
" 3— 10 to 15 " " " "	85.00

We also make special gears for direct drive and marine uses. If you wish to eliminate all your transmission troubles get the **CHAMPION**. Not Cheapest, but Best.

Liberal discount to the trade.

New catalogue ready about the 20th.

THE CHAMPION MFG. CO.

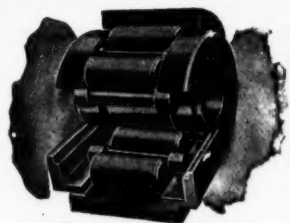
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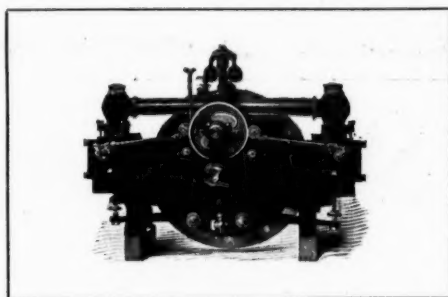
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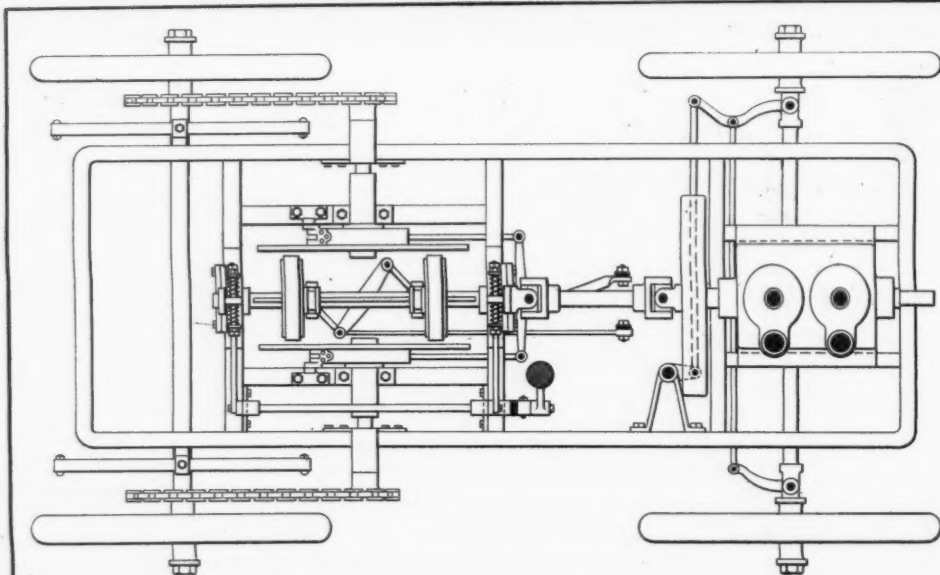
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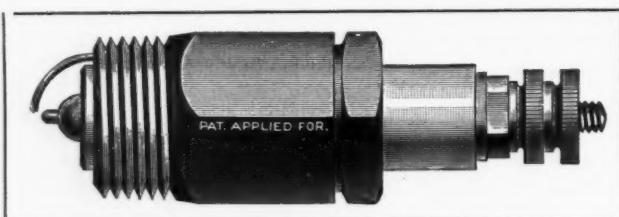
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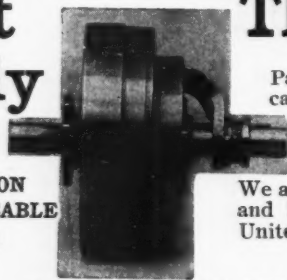


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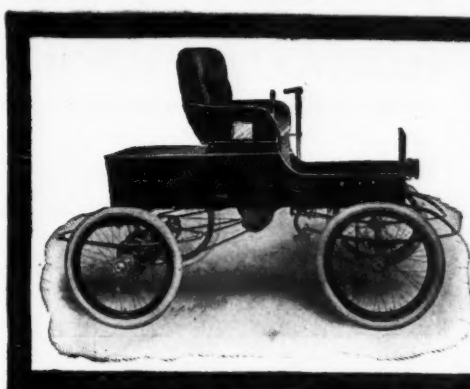
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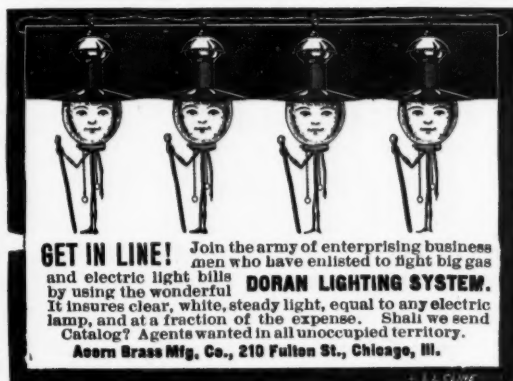
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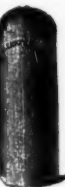
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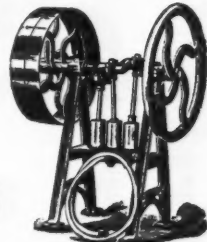
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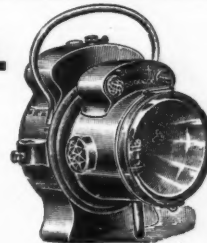
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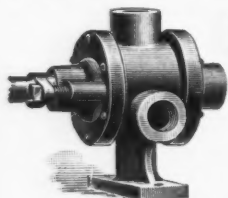
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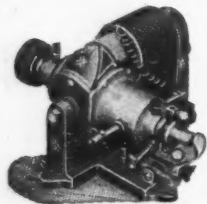
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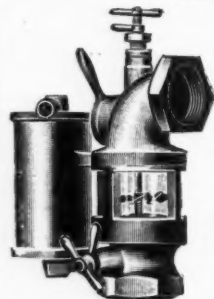
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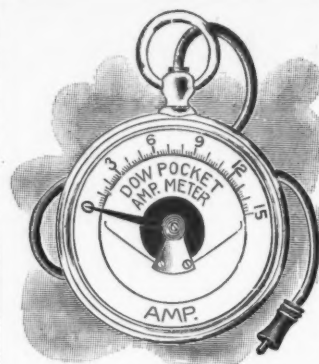
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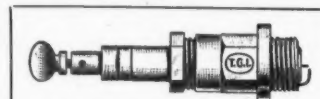
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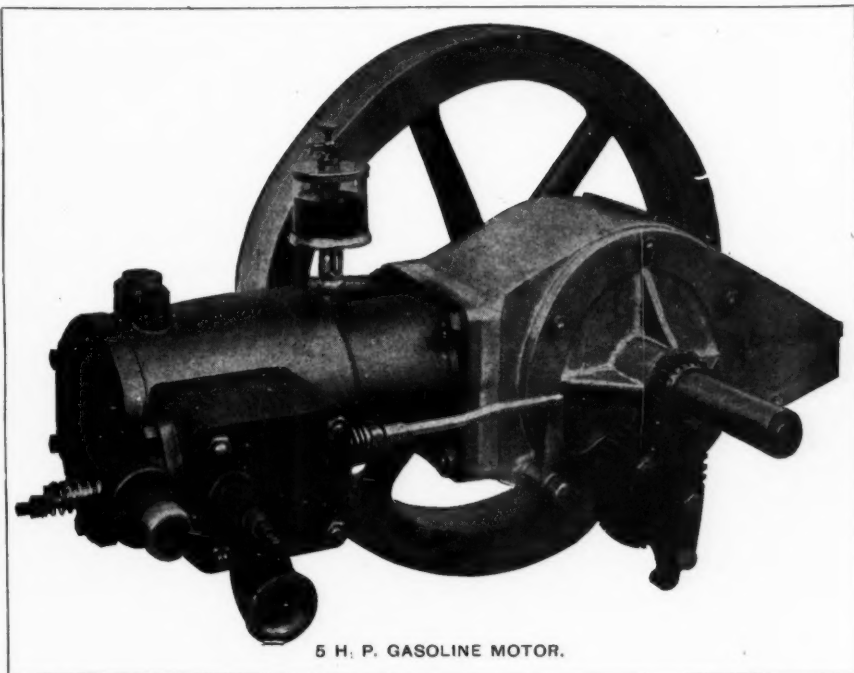
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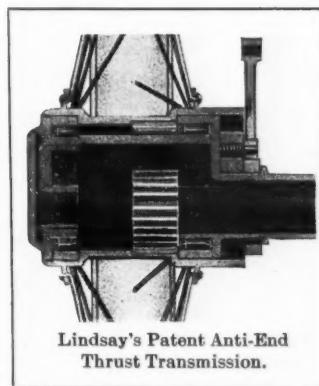
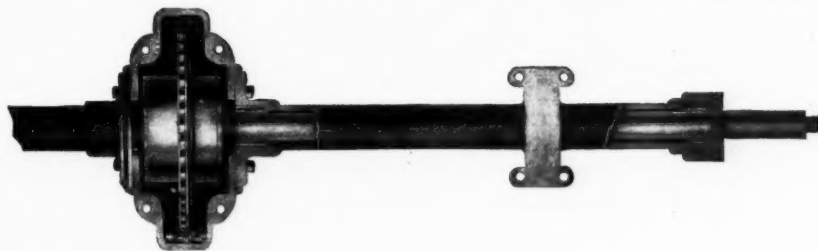
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